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U.S. DEPARTMENT OF AGRICULTURE

Volume I

EXPLANATORY NOTES

for

DEPARTMENT OF AGRICULTURE

Fiscal Year

1952

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(Volume I)

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AGRICULTURAL RESEARCH SERVICE

Purpose Statement

The Agricultural Research Service was established by the Secretary of Agriculture on November 2, 1953 under the authority of Sec. 161, Revised Statutes (5 U.S.C. 22), Reorganization Plan No. 2 of 1953 and other authorities. It conducts all of the production and utilization research of the Department (except forestry research), and the inspection, disease and pest control and eradication work closely associated with this research. The Administrator of this Service is also responsible for the coordination of all research of the Department.

The program of the Agricultural Research Service is organized under three areas of activity as follows:

1. Research is conducted under five major categories:
(a) Crop research; (b) Farm and land management research;
(c) Livestock research; (d) Home economics research; and
(e) Utilization research.
2. Regulatory activities are conducted under three major categories:
(a) Plant disease and pest control; (b) Animal disease and pest control; and (c) Meat inspection.
3. The Service administers the Federal-grant funds for research at the State Agricultural Experiment Stations and operates experiment stations in Puerto Rico, Virgin Islands, and Alaska.

The Agricultural Research Service also carries out emergency programs, when necessary, for the control and eradication of animal diseases, such as foot-and-mouth disease and vesicular exanthema of swine, and for the control of emergency outbreaks of insects and diseases. In addition, research on the feasibility of developing domestic sources of supplies for agricultural materials designated as strategic and critical by the Office of Defense Mobilization is conducted upon their recommendation or approval. Research on foot-and-mouth disease is conducted at Plum Island, New York in facilities made available to this Department by the Department of the Army and, in 1957, will be carried on in the new laboratory for which \$10 million was provided in the Urgent Deficiency Appropriation Act, 1952.

The Agricultural Research Service maintains a central office in Washington, D. C., and operates the 12,000 acre Agricultural Research Center at Beltsville, Maryland. However, most of the work is conducted at approximately 528 other locations in the United States, Territories and Possessions and at several locations in foreign countries. Much of the work is conducted in cooperation with the State Agricultural Experiment Stations and with other agencies, both public and private. On November 30, 1955, there were approximately 13,610 full-time employees, of which 3,019 were in the Washington Metropolitan area and 10,591 were located at other points in the United States, Territories and Possessions, and foreign countries.

	Estimated Available, <u>1956</u>	Budget Estimate, <u>1957</u>
Appropriated funds:		
Salaries and expenses:		
Research	40,205,155	49,972,000
Plant and animal disease and pest control	19,680,700	21,200,000
Meat inspection	15,369,000	15,745,000
Total	<u>75,254,855</u>	<u>86,917,000</u>
Payments to States, Hawaii, Alaska, and Puerto Rico	24,753,708	29,503,708
Foot-and-mouth and other contagious diseases of animals and poultry - Research	1,945,000	3,993,000
Animal disease laboratory facilities	250,000	- -
Total appropriated funds	<u><u>102,203,563</u></u>	<u><u>a/ 120,413,708</u></u>

a/ In addition, the 1957 budget proposes an appropriation to reimburse the Commodity Credit Corporation for funds advanced and expenses incurred in fiscal year 1955 for (1) eradication of foot-and-mouth disease (\$1,269,330) and (2) for the intensified brucellosis eradication program (\$11,791,624). These items are included in these justifications under "Special activities".

Summary of Appropriations, 1956, and Estimates, 1957

Appropriation Item	Total	Budget	Increase
	Estimated	Estimates,	or
	Available,	1957	Decrease
	1956		
Salaries and expenses, Agricultural Research Service:			
Research	\$40,205,155	\$49,972,000	+\$9,766,845
Plant and animal disease and pest control	19,680,700	21,200,000	+ 1,519,300
Meat inspection	15,369,000	15,745,000	+ 376,000
Total, Salaries and expenses, ARS	75,254,855	86,917,000	+11,662,145
Payments to States, Hawaii, Alaska, and Puerto Rico, Agricultural Research Service	24,753,708	29,503,708	+ 4,750,000
Foot-and-mouth and other contagious diseases of animals and poultry Research	1,945,000	3,993,000	+ 2,048,000
Eradication activities	a/ - -	b/ - -	- -
Animal disease laboratory facilities	c/ 250,000	- -	- 250,000
Research facilities for foot-and-mouth and other diseases of animals at Plum Island, N.Y.	d/ - -	- -	- -
Total	102,203,563	120,413,708	+18,210,145
Special Activities			
Research on strategic and critical agricultural materials	316,000	316,000	- -
Reimbursements to Commodity Credit Corporation for advances for animal disease eradication activities:			
For eradication of foot-and-mouth disease	e/5,788,897	f/1,269,330	- 4,519,567
For brucellosis eradication ..	- -	f/11,791,624	+11,791,624
Total, Reimbursements to Commodity Credit Corporation	5,788,897	13,060,954	+ 7,272,059
Total, Special Activities	6,104,897	13,376,954	+ 7,272,059

- a/ \$2,165,000 consisting of transfers of prior year balances and a transfer from Commodity Credit Corporation funds are available for eradication of vesicular exanthema of swine in 1956.
- b/ 1957 Budget proposes continuation of authority to transfer funds from other appropriation accounts of the Department to this appropriation to finance emergency disease eradication activities, including not to exceed \$1,550,000 for eradication of vesicular exanthema of swine.
- c/ The Supplemental Appropriation Act, 1956, provided \$250,000 for surveys, plans, and specifications for constructing or altering animal disease research and control laboratory facilities. It is anticipated that a supplemental estimate will be submitted in fiscal year 1956 to cover the costs of alterations and construction of such facilities.
- d/ It is estimated that \$1,067,454 will be obligated in fiscal year 1956. This is the entire unobligated balance brought forward from prior years. The facilities are expected to be completed about March, 1956.
- e/ To cover unreimbursed expenses through fiscal year 1954, including interest thereon through June 30, 1955.
- f/ To cover unreimbursed expenses through fiscal year 1955, including interest thereon through June 30, 1956.

(a) Salaries and Expenses

	<u>Research</u>	<u>Plant and Animal Disease and Pest Control</u>	<u>Meat Inspection</u>	<u>Total</u>
Appropriation Act, 1956	\$37,950,000	\$18,658,700	\$14,325,000	\$70,933,700
Proposed supplemental, 1956				
for pay act costs	2,267,530	1,027,780	1,048,690	4,344,000
Activities transferred in the 1957 estimates to "Salaries and Expenses, Office of the Secretary of Agriculture" for personnel investigations .	-12,375	-5,780	-4,690	-22,845
Base for 1957	40,205,155	19,680,700	15,369,000	75,254,855
Budget Estimate, 1957	49,972,000	21,200,000	15,745,000	86,917,000
Increase	+9,766,845	+1,519,300	+376,000	+11,662,145

SUMMARY OF INCREASES, 1957

Research:

To expand field crops research:.....	+1,531,000
For improvement of practices for establishment, maintenance, and efficient production of pastures and rangeland	+675,000
For reducing cotton production costs and developing and improving cotton quality for specific end uses	+325,000
For development of varieties of tobacco with multiple disease resistance and high quality to decrease heavy losses	+106,000
For lowering farm costs by developing more efficient weed control measures	+275,000
For development of profitable new field crops ..	+150,000
To strengthen horticultural crops research:	+1,009,000
For introduction and development of new crops ..	+400,000
For development of measures to control nematodes and soil-borne diseases	+106,000
For continuation of research on cantaloupe disease and insect problems in the Southwest .	+53,000
For establishment of a National seed storage laboratory for the preservation of valuable seed stocks	+450,000
To strengthen entomology research:	+404,000
For studies on control of insects affecting livestock and insects reducing forage and range production	+203,000
To develop improved methods for the control of cotton insects	+75,000
For studies on insecticidal residues and the development of recommendations for the safe use of new insecticides on food and feed crops	+126,000

To intensify soil and water conservation research:	+1,055,000
For studies to assist in farm adjustment and soil and water conservation by develop- ment of lower cost practices in soil and water management	+950,000
To intensify work on water conservation and wind erosion control for relief of emergency conditions in the Great Plains wheat areas	+105,000
To reduce livestock production costs by mechanizing livestock operations and the production of livestock feed, including research on the expanded use of electric power on farms ...	+323,545
To expand economic research:	+872,000
To provide economic guides to farm produc- tion adjustments and soil and water conserva- tion by research on farm costs and returns and on water management	+350,000
For studies on the economic problems of adapting farming to the hazardous condi- tions of Great Plains agriculture	+192,000
For assistance to low-income farm families to increase their income-earning capacity	+330,000
To strengthen livestock research:	+1,425,000
To reduce the cost of livestock production and to adjust quality to market demands	+1,200,000
For construction of a modern centralized poultry brooder house at Beltsville, Maryland	+225,000
For research on the nutritive value of livestock products ...	+200,000
For household economics research:	+124,300
For determining needed shifts in food consumption and for strengthening nutrition programs	+50,000
For assistance to farm families in low- income areas to improve their living through more efficient use of family resources.	+74,300
For development of new and improved food, feed, and industrial products from wheat, and other small grains, and forage	+460,000
For investigations to create new markets for cotton, wool and mohair	+400,000
To construct a laboratory in Winter Haven, Fla., for research on citrus and other fruits and vegetables	+810,000
To expand utilization research on sugar and special plants: .	+600,000
For investigations on new crops valuable for food, feed, drug or industrial use	+500,000
For investigations to expand uses of tobacco, sugar, and special crops	+100,000
For research to increase the farmers' market for poultry, dairy products, meat, and animal hides	+553,000
Increase for Research	<u>+9,766,845</u>

Plant and animal disease and pest control:

To increase the contingency fund for emergency outbreaks of insects and plant diseases	+500,000
To strengthen plant quarantine work:	+966,300
To provide, through the Bureau of Customs, for checking baggage to an adequate level to allow detection of prohibited or restricted plant materials in passenger baggage	+856,000
For increasing inspection service at ports of entry	+110,300
To strengthen animal inspection and quarantine work along the Mexican border	+53,000
Increase for Plant and animal disease and pest control	+1,519,300

Meat inspection:

To strengthen the meat inspection service to meet the increasing work-load	+376,000
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Total Increase, Salaries and Expenses	<u>+11,662,145</u>
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PROJECT STATEMENT

Project	1955	1956 (estimated)	Increase or Decrease	1957 (estimated)
1. Research				
a. Crops research:				
(1) Field crops ...	\$5,037,877	\$5,777,700	+\$1,531,000 (1)	\$7,308,700
(2) Horticultural crops	3,546,453	3,964,500	+1,009,000 (2)	4,973,500
(3) Entomology	3,910,756	4,429,500	+404,000 (3)	4,833,500
Total, crops research	12,495,086	14,171,700	+2,944,000	17,115,700
b. Farm and land management research:				
(1) Soil and water conservation	3,637,963	3,949,200	+1,055,000 (4)	5,004,200
(2) Agricultural engineering	1,521,646	1,691,955	+323,545 (5)	2,015,500
(3) Production economics	1,397,964	1,689,400	+872,000 (6)	2,561,400
Total, farm and land management research	6,557,573	7,330,555	+2,250,545	9,581,100
c. Livestock research:				
(1) Animal and poultry husbandry	2,431,657	2,685,100	+775,000 (7)	3,460,100
(2) Dairy husbandry	1,293,367	1,511,000	+200,000 (7)	1,711,000
(3) Animal disease and parasite	2,204,968	2,474,300	+450,000 (7)	2,924,300
Total, livestock research	5,929,992	6,670,400	+1,425,000 (7)	8,095,400

(Continued on next page)

Project	1955	1956 (estimated)	Increase or Decrease	1957 (estimated)
d. <u>Administration of</u>				
<u>payments to States,</u>				
<u>and Territorial</u>				
<u>Research:</u>				
(1) State experiment:				
stations	152,365:	222,200:	- -	222,200
(2) Territorial ex-				
periment stations :	560,781:	618,800:	- -	618,800
Total, administra-				
tion of payments:				
to States and				
Territorial				
research	713,146:	841,000:	- -	841,000
e. <u>Home economics</u>				
<u>research:</u>				
(1) Human nutrition :	596,913:	717,000:	+200,000 (8):	917,000
(2) Household				
economics	493,391:	446,800:	+124,300 (9):	571,100
(3) Clothing and				
housing	332,498:	362,200:	- -	362,200
Total, Home				
economics re-				
search	1,422,802:	1,526,000:	+324,300	1,850,300
f. <u>Utilization</u>				
<u>research:</u>				
(1) Cereal and				
forage crops	1,441,033:	1,513,800:	+460,000(10):	1,973,800
(2) Cotton and				
other fibers	1,515,087:	1,762,000:	+400,000(11):	2,162,000
(3) Fruits and				
vegetables	1,995,502:	2,047,800:	+810,000(12):	2,857,800
(4) Oilseeds	1,129,822:	1,194,700:	- -	1,194,700
(5) Sugar and				
special plants ..	923,462:	920,600:	+600,000(13):	1,520,600
(6) Poultry, dairy,				
and animal pro-				
ducts	1,809,932:	1,970,800:	+553,000(14):	2,523,800
(7) Agricultural				
residues	232,003:	255,800:	- -	255,800
Total, utilization:				
research	9,046,841:	9,665,500:	+2,823,000	12,488,500
Total research :	36,165,440:	40,205,155:	+9,766,845	49,972,000
2. <u>Plant and animal</u>				
<u>disease and pest</u>				
<u>control:</u>				
(a) <u>Plant disease and</u>				
<u>pest control:</u>				
(1) Plant pest				
control	6,427,167:	7,207,700:	+500,000(15):	7,707,700
(2) Plant quarantine:	2,650,042:	3,176,900:	+966,300(16):	4,143,200
Total, plant dis-				
ease and pest				
control	9,077,209:	10,384,600:	+1,466,300	11,850,900

(Continued on next page)

Project	1955	1956 :(estimated):	Increase or Decrease	1957 :(estimated)
b. Animal disease and pest control:				
(1) Animal disease control and eradication	7,327,315:	7,936,400:	- -	7,936,400
(2) Animal quarantine	1,291,853:	1,359,700:	+53,000(17):	1,412,700
Total, animal disease and pest control	8,619,168:	9,296,100:	+53,000	9,349,100
Total, plant and animal disease and pest control:	17,696,377:	19,680,700:	+1,519,300	21,200,000
3. Meat inspection	14,618,335:	15,369,000:	+376,000(18):	15,745,000
Unobligated balance ...	504,922:	- -	- -	- -
Total pay act costs (P.L. 94)	[1,194,618]:	[4,344,000]:	[+532,000]	[4,876,000]
Total available or estimate	68,985,074:	75,254,855:	+11,662,145	86,917,000
Transferred from:				
"Foot-and-mouth and other contagious diseases of animals and poultry, Agricultural Research Service, research"	-88,475:	- -		
"Salaries and Expenses, Federal Extension Service"	-408,369:	- -		
Transfers in 1956 estimates from or to other accounts	-491,685:	- -		
Transfer in 1957 estimates to other accounts	+21,034:	+22,845:		
Proposed supplemental due to pay increases	- -	-4,344,000:		
Total appropriation or estimate	68,017,579:	70,933,700:		

- a/ Excludes \$50,000 transferred for fiscal year 1956 from the subappropriation "Plant and animal disease and pest control" under the authority of section 702(b) of the Department of Agriculture Organic Act of 1944 for research on cantaloupe disease and insect problems in the Southwest, (see footnote c).
- b/ Excludes \$12,000 transferred for fiscal year 1956 from the appropriation, "Foot-and-Mouth and Other Contagious Diseases of Animals and Poultry, Agricultural Research Service, Eradication Activities" under the authority of section 702(b) of the Department of Agriculture Organic Act of 1944 for research to support the vesicular exanthema eradication program.
- c/ Does not reflect transfer of \$50,000 for fiscal year 1956 to the subappropriation "Research" under the authority and for the reasons stated in footnote "a" above.

INCREASES

The increase of \$9,766,845 under the subappropriation item "Research" consists of the following:

(1) Increase of \$1,531,000 under the activity, "Field crops research," composed of:

(a) Increase of \$675,000 for research on improvement of practices for establishment, maintenance, and efficient production of pastures and rangelands.

Problem and Need: To meet the needs for soil building crops in the Great Plains, Pacific Northwest and the southeastern states farmers must have persistent productive varieties of grasses and legumes adapted to the various regions. More economical and reliable methods of establishing both seeded and asexually propagated plants must be developed to reduce current excessive costs. Grazing and management systems must be improved to insure maximum productivity and longevity of stands. Disease resistance must be incorporated into adapted grasses and legumes.

There are more than 125 different grasses and legumes used in the various regions of the United States. Some of these species have been improved to produce more economically hay, pasture, range, green manure and cover crops for feed, soil conservation, watershed protection and for similar major uses. Most grass and legume species have not been improved by the plant scientists because the job is greater than with annuals, such as corn, soybeans, wheat or cotton, and available funds have had to be concentrated on a relatively few major forage species such as alfalfa, lespedeza and bermudagrass. Expanded research can contribute materially to reducing fluctuations in the yearly production of hay and pasture crops.

In the South, additional research is needed on soil-conserving and hay and pasture crops, to develop persistent, disease-resistant clovers and grasses, low-tannin lespedezas and more persistent trefoil species; to produce superior disease and lodge-resistant sorghum for forage and silage and to incorporate the perennial character in sorghum for forage; to study quality, including fiber, carbohydrate and protein content for feed and syrup production in the Southern States; and to develop more economical methods of establishment of seeded and vegetatively propagated pasture plants and their subsequent management under grazing.

In the Great Plains Region where wheat is in surplus there is need to develop dryland grazing legumes and grasses with superior reseeding and forage qualities; grass and legume combinations for use on cropland to supplement native range pastures; to develop less expensive and more reliable establishment methods; and to develop more effective grazing and management systems. Brush removal or eradication is one of the first steps for range improvement in this area, however, brush eradication must be followed with the establishment of well adapted grasses and legumes, and by the proper grazing and other management practices to prevent rapid re-invasion by brush. Similar research is needed in the far West.

In the cornbelt, there is a great need to improve the profitableness of forage production to make grassland more competitive with grain crops, and to encourage production of these soil-building grasses and legumes. This can be done by breeding varieties with more disease and insect resistance and higher nutritive value.

Plan of Work: Research for an expanded grassland program would include breeding, cytogenetic, pathological and physiological studies to accomplish the overall objective of profitable and desirable adjustment in crop and land use. Research on reseeding methods and grazing and cultural management systems would be undertaken to provide the information required by farmers, stockmen, and Federal land-management agencies for more efficient methods of stabilizing the soil and forage yields. To assure ample supplies of the varieties of forage seed best adapted for the various problem areas, research would be conducted to determine the areas of most stable and satisfactory seed production and to aid in the rapid development and maintenance of supplies of such improved varieties. Frequently the superior forage and pasture varieties produce little or no seed in the area of use.

The work would be conducted in cooperation with the state agricultural stations in each of the problem areas. By research activity, the funds would be distributed approximately as follows:

Pasture and range research	
Arid, semi-arid, and sub-humid areas	\$ 141,800
Humid area	137,500
Grass production and breeding	138,500
Alfalfa production and breeding	64,900
Clover production and breeding	81,400
Lespedeza, lupines, trefoil, and southern legume production and breeding	81,300
Soybean production	5,600
Distribution of foundation seed-stocks of small- seeded legumes and grasses	24,000
	<u>675,000</u>

(b) Increase of \$325,000 to expand research on reducing cotton production costs and developing and improving cotton quality for specific end uses.

Need for Increase: To aid the cotton farmer to attain and maintain a profitable competitive position, more attention must be given to

improvement of production practices, reducing costs, and enhancing quality and market value of his crop. The accumulation of large carry-overs of cotton, especially of off-quality types, in spite of acreage control has contributed heavily to the present depressed state of agriculture in this country. To be successful cotton must meet its competition both from foreign growths abroad and from synthetic fibers. It is necessary to continue to improve the fiber properties of cotton so that it can meet this competition. Research directed to this end would have as an objective not producing more cotton but producing superior quality cotton in high yielding varieties so that production costs of such fibers would be adequately low to enhance the use of domestic cotton and permit it to compete successfully with foreign and synthetic fibers.

The development of cotton varieties with improved fiber qualities has not been explored adequately as a means of improving returns to the cotton farmer. A wide variety of fiber properties are available in different strains and species and should be incorporated into adapted commercial types through an expanded breeding program to improve the quality and market value of the farmer's crop.

One of the serious hazards to production efficiency is the localized danger of losses from diseases — seedling diseases that reduce stands and make it necessary to replant the crop, mature plant diseases that reduce yield, and those that reduce the quality of the fiber. Research directed to overcoming these production hazards could very well result in fewer acres in cotton that would be more profitable to the grower due to lower production costs and higher quality, thereby enabling growers to meet better the competition of foreign growths and man-made fibers, especially those that now are selling below the present price of American cotton.

Boll rots and field deterioration of mature fibers, particularly in the southeast, result in the farmer receiving lowered income through decreased quality of products. Growers in Verticillium wilt areas frequently suffer substantial crop losses late in the season after production investments have been made. They also suffer further monetary losses because of immaturity and lowered quality in the cotton harvested from wilt affected plants. A more intensive search for stocks resistant to Verticillium wilt is needed.

Plan of Work: It is planned to organize at an existing field location the work that will be concerned primarily with breeding for improved properties. The studies will be aimed at seeking new sources of fiber properties, determining their inheritance, and attempting to incorporate them into higher yielding strains. It is also planned to increase the research now being done on breeding for fiber properties presently evaluated. In recent years the advances that have been made in devising tests for fiber quality and in evaluating the significance of specific fiber properties have placed the cotton breeder in a much better position than formerly to improve fiber quality. Improving the inherent qualities of the raw fiber through breeding without reducing yield is a difficult process. To the extent, however,

that this can be done, the greater is the share of the farmer's profit. Also to the extent that the processing efficiency or serviceability of the raw product can be improved, the better the chances are for increased cotton consumption through lower mill costs and increasing consumer demand.

Research on reducing losses due to disease would be expanded both in the South and Southwest. The work would be conducted in cooperation with state agricultural experiment stations.

(c) Increase of \$106,000 to strengthen research to develop varieties of tobacco with multiple-disease resistance and high quality to decrease heavy losses.

Need for Increase: The average annual loss in farm value of all tobacco types from diseases alone amounts to approximately \$321,000,000. At least five groups of disease including fungus, bacterial, nematode, and those of virus origin, cause serious losses in yield and quality of the tobacco crop. The development of tobacco varieties resistant to these major diseases even though reducing the total estimated loss by only 10 percent, would represent a savings to growers of approximately \$32 million annually.

The release of varieties such as Dixie Bright 101, 102 and 28, and Burley 11A, 11B and more recently 21, although possessing resistance to one, or in combinations for not more than three of the major diseases in a single variety, has had a great influence on the maintenance of tobacco production in the flue-cured and burley areas. Within each of the tobacco types, including flue-cured, burley, Maryland, dark air-cured, dark fire-cured, cigar filler, cigar binder, and cigar wrapper, varieties possessing multiple resistance to such major diseases as root rots, root knot, black shank, wilt, blue mold, wildfire, and mosaic, are needed since these diseases continue to spread and overlap one another, presenting new complex problems to many areas.

Investigations indicate that heritable factors for high-level resistance or complete immunity to the major tobacco diseases can be obtained from the germ plasm of some of the 53 wild tobacco species which are maintained for breeding and cytogenetic investigations at Beltsville. Approximately one-third of the wild tobacco species investigated contain nicotine in the cured leaf samples; whereas most of the remainder contain some nicotine but also other related but undesirable alkaloids. Although some of the quality potentialities, such as amount and kind of alkaloids, are known to be associated with the genetic constitution of varieties and species, most of the breeding work for developing improved varieties for disease resistance and satisfactory yields has been done without sufficient basic knowledge of heritable quality characteristics of the breeding stock.

The problems concerning heritable quality factors within and among the various types and species of tobacco are closely associated with the development of new multiple-disease resistant varieties for the various production areas, and are an essential component of the basic

program. The rapid development of multiple-disease resistant lines has become a necessity for the continued production of all types of tobacco. Basic studies on heritable quality characteristics and interacting pathogen-host relationships should be undertaken as a fundamental part in the development of improved varieties possessing multiple-disease resistance, quality, and yielding ability acceptable to both growers and manufacturers.

Plan of Work: Research in breeding, selection and evaluation (chemical and physical) would be expanded to improve disease resistance, yield and quality in the production areas of the several types of tobacco. Work would be conducted for tobacco varieties grown principally in Florida, Georgia, North Carolina, South Carolina, Tennessee, Kentucky, Wisconsin, Pennsylvania, Connecticut, Maryland, and Virginia.

State experiment stations are presently spending annually for tobacco research dealing with local problems an amount equal to or greater than the funds available for tobacco research by the Federal government, including the proposed increase. This research program would be conducted on a cooperative basis with the States to make the most rapid advances for developing basic strains and improved varieties for the several types in the different production areas.

(d) Increase of \$275,000 to lower farm costs by developing more efficient weed control measures.

Need for Increase: Weeds in 58 major crops are resulting in an annual loss of \$3.2 billion annually. Annual losses in pastures from weeds and brush have been estimated at 9 percent of the total production — about one-half billion dollars annually. Weed control on small grains underseeded with legumes is hazardous and causes an annual loss estimated at more than \$75 million. Aquatic weeds that cause interference in irrigation and drainage canals cause a heavy annual water loss to farmers in irrigated areas. They present a flood hazard to farm lands and municipalities by clogging drainageways and impeding water flow. The steady availability of new potential herbicide chemicals for evaluation for specific weed control purposes provides a fruitful opportunity to reduce costs and losses materially by expanded research in this field. Chemical weed control facilitates increased mechanization and decreases the hazards of an inadequate supply of farm labor.

Control of weeds in horticultural crops requires specialized equipment and many hours of hand labor. Vegetable and fruit crops are produced on 7 million acres. Cost of controlling weeds in these crops ranges from \$10 to \$100 per acre. Chemical weed control can reduce these costs by at least 50 percent since it is most adaptable to these high production costs crops. Expanded research is needed to determine the most effective herbicides for weed control on the major vegetable and fruit crops with emphasis on the direct and indirect effect of herbicides on the composition and quality of the edible portion of the fruit or vegetable.

Chemical weed control in field crops was used for one out of every ten acres of these crops in 1953. Weed control on small grains underseeded with legumes is hazardous and results in the loss of more than 2 bushels per acre. Increased emphasis is needed to develop herbicides for weed control in corn, soybeans, peanuts, sugar beets, and sugar cane. Weed competition and contamination are two of the most costly and difficult phases of legume and grass seed production. The long-range effects of herbicides on soils should be continuously studied since accumulations could result in great losses.

Weeds and brush constitute a major limiting factor in the establishment of forage crops and forage production. In both humid and dry land regions, they are in direct competition with forage plants for nutrients, light, and water. In the Southeast, the control of annual and perennial weeds and woody plants in established grass-legume pastures are the most important problems. In particular, methods are needed for the control of gallberry and palmetto in coastal plains piney woods rangelands. In the North Central and Southwest areas, research on the control of mixed species of oak, mesquite, sage brush, and other range weeds should be expanded. Additional emphasis should be given to the control of weeds on land where new forage crops are being established and in reseeded areas. In the Western Region and Inter-Mountain States, coyote brush, chaparral, chamise, and associations of other woody plants are invading valuable grazing lands. Grazing capacity of most of the western ranges is being reduced due to the invasion of brush and noxious plants. The first step in reclaiming these lands in preparation for reseeding is to eliminate the brush. Eradication by mechanical means has proven ineffective or uneconomical on much of this land. Chemicals have shown promise for the control of certain species but fundamental studies are needed to permit more consistently effective results.

Aquatic weeds in the irrigated areas of the west and in the drainage districts of the southeast are causing serious problems in water management.

In the west, aquatic and other weeds in and along 120,000 miles of unlined irrigation systems cause annual water losses of more than $1\frac{1}{2}$ million acre-feet, with an annual gross value of \$25 $\frac{1}{2}$ million. Aquatic weeds clog structures, reduce water flow, cause ditchbreaks, form silt bars, increase seepage, and result in waterlogged and flooded soils and crops.

In a summary prepared by the Soil Conservation Service on State Research Needs, 19 states indicated a need for increased weed research. The National Reclamation Association and the Pacific Southwest Federal Inter-Agency Technical Committee on formal actions have requested the Department of Agriculture to expand research on the control of aquatic weeds. The Bureau of Reclamation, Department of the Interior, has also strongly supported the need for expanded research on aquatic weeds.

Plan of Work: Basic studies would be undertaken on all phases of chemical weed control to develop cheaper and more effective methods. Special attention would be given to the development of herbicides with greater selectivity in killing the noxious weeds while not affecting the crop being grown. Relatively little has been done in this field with vegetable crops where the costs of weed control are high. The toxicological effects of residues from herbicide applications would be studied both in relation to the crop being protected and to the effect of long-term accumulations of such residues in the soil. The work would be conducted in cooperation with the state experiment stations, other government agencies, and industry and would be distributed approximately as follows:

Control of weeds in field crops	\$ 50,000
Control of weeds in fruit and vegetable crops	50,000
Control of weeds on pasture and range lands	75,000
Control of aquatic weeds	100,000
	<u>275,000</u>

(e) Increase of \$150,000 for the development of profitable new field crops

Need for Increase: The need of farmers for profitable new crops to supplement cash income constitutes a top priority problem in agricultural research. Sesame, safflower, and castorbeans offer extensive possibilities for the production of specialized oils not generally available except through imports. Sesame and safflower also provide valuable supplemental protein foods for livestock where protein shortage exists. These crops have been introduced and are being grown in limited areas where suitable varieties have been developed. Sporadic attempts by farmers in other areas to grow the new crops have been relatively unsuccessful because adequate research information and adapted varieties were not available. Research should be expanded to develop varieties that are disease resistant and adapted to areas where the need for alternate crops is urgent.

Plan of Work: Safflower is now grown on about 75,000 acres in the rice and soft wheat areas in the Pacific Coast States and in the winter wheat area in the Northern Great Plains. Crop returns have been satisfactory in the limited localities where adapted varieties are available. Diseases have developed with the increase in acreage. Root rot diseases make production hazardous in the irrigated areas of the Southwest and new races of rust are causing losses in California and threaten production in Nebraska and Colorado. Research would be undertaken to develop improved, disease-resistant varieties with increased oil and protein content not only for the present areas of production but suitable for extending production into new areas.

Prior to 1955, sesame varieties suited to economical production were not available and excessive harvesting costs limited production. Two new nonshattering varieties developed in the research program were released to certified growers in Texas and South Carolina in 1955. Sufficient seed to plant approximately 100,000 acres will be available in 1956. Many cotton belt States other than Texas and South Carolina are potential sesame producing areas if specialized disease resistant varieties can be developed. The research program would be expanded, using germ plasm now available, to develop improved nonshattering sesame varieties adapted to these other areas.

Castor bean production in the upper Mississippi Delta and other Southern States has been limited by the lack of improved disease-resistant varieties adapted to these areas. Improved varieties have been developed for a few areas, especially for Oklahoma and irrigated areas of the West, but funds are inadequate to extend the work. Factors for disease resistance and improved plant type exist in present breeding lines. Research would be expanded to develop varieties adapted for the South and South Central States where improvement in disease control and yield would greatly stimulate domestic production.

(2) Increase of \$1,009,000 under the activity, "Horticultural crops research", composed of:

(a) Increase of \$400,000 for the introduction and development of new crops.

Need for Increase: The exploration, introduction, evaluation, and testing of new plants suitable for new agricultural and industrial uses should be accelerated in order to promote a more diversified and profitable agricultural industry. New crops are especially needed in areas where now only a few adapted crops can be grown and cropping adjustments are needed.

Plant introduction involves collecting and bringing valuable plant material under preliminary observation, recommending the most promising to Federal and State experiment station workers, and increasing and maintaining for distribution small basic plantings or seedstock of the most valuable material at Federal Plant Introduction stations. Most of the introduced material is related to crops already grown in the United States and is screened for variations which may bring crop improvement. Plants are also introduced which show promise of becoming entirely new crops. The evaluation and development of a wild plant into a cultivated crop is time consuming and costly.

All of the principal present U. S. crops were originally "new" and introduced into this country. Examples of introduced new crops are soybeans, tung nuts, wheat grass, a Russian introduction now grown over thousands of acres for hay and forage in the arid Northwest; Korean lespedeza, worth millions annually to farmers in the South-Central United States as hay and winter forage; Acala cotton; and avocados.

More than half a million different kinds of plants are known in the world, yet hardly a handful are cultivated by man and most of these have been in cultivation since prehistoric time. Man has been largely content with the improvement of these few crops, fitting them to new environments, developing varieties with higher quality and higher production. Very little has been done to investigate the hundreds of thousands of other plants for food, fiber, drug, or industrial use.

Expansion of the search for and evaluation of potential new crops offers one of the most promising basic sources of improving agricultural conditions and our standards of living.

Plan of Work: To realize the most immediate benefits, work would be expanded with a limited group of plants which has shown the highest potentiality of becoming new crops.

Preliminary trials with timber bamboo have indicated that it is well adapted for growth over a wide area of Southeastern United States. From work under a research contract, it has been shown that bamboo is an excellent source of paper pulp, especially in the field of cigarette paper, toweling, filter paper, and book paper where thinness and strength are important. In cooperation with the South Carolina Agricultural Experiment station, test plantings would be made to determine the production per acre in large plantings, economical methods of harvest and handling, and other data needed to determine whether the crop would be practicable.

A new crop plant, *Tephrosia vogelii*, gives promise of being a new and abundant source for rotenone. Over 6 million pounds of rotenone were used in the United States in 1953-54. The importance of rotenone is emphasized because it creates no hazard to public health when applied to an agricultural crop and because insects have not developed resistance to it as they have to many of the newer chlorinated insecticides. *Tephrosia* contains as much as 5% rotenone and rotenoids in the stems and leaves. It can be grown in the Southern States, where indicated yields of 2-1/2 to 3 tons fresh weight per acre greatly exceed the yields of Derris and *Lonchocarpus* from which present supplies of rotenone are obtained. Since *Tephrosia* will flower and set seed only in the tropics, cultural and breeding studies with it would be conducted by the Federal Experiment Station in Puerto Rico to provide information and seed of improved strains for further research on production in the continental United States.

Preliminary tests with certain grasses and legumes, wax producing shrubs (*Simmondsia*, *Candelilla*) and drug plants (*Rauvolfia*, *Dioscorea*) indicate that they hold high promise as new crops. Although a market is waiting for all of them, information is needed as to whether their products can be agriculturally produced at a profit to the grower. It is proposed to speed up studies on cultural practices and adaptability. Work would be expanded to speed up the screening and testing of some 25,000 plant introductions already held at Plant Introduction stations. With present professional personnel for this work limited to 6, progress has been slow. The regional program of screening plant material in cooperation with the State experiment stations would also be accelerated.

(b) Increase of \$106,000 to expand research on nematodes and soil-borne diseases, including spreading decline of citrus.

Problem and Need: Soil-borne diseases caused by nematodes, fungi, bacteria, and viruses result in losses of crop production amounting to hundreds of millions of dollars annually in this country. They are serious in all kinds of crops. Reduction of these losses can be a major boon to American agriculture.

The problems caused by harmful soil organisms can be attacked successfully only with knowledge of the life history and habits of the many forms responsible for reduced yields of crop plants and of the interrelationships of methods of culture, crop sequences, management of crop residues, manures, green manures, soil nutrients, and the beneficial vs. harmful micro-life of the soil, including fungi, bacteria, nematodes, protozoa, and others. The number of nematodes in agricultural soils varies from hundreds of thousands to many millions per square yard. Long-time, extensive, basic studies must be made of the micro-ecology of the soil to find out how beneficial organisms can be favored so they will suppress or control harmful ones; or how to produce conditions directly unfavorable for harmful organisms without adverse effect on beneficial ones. *Fusarium* and verticillium wilts, *Rhizoctonia*, *Sclerotinia*, and southern root rots are a few of the serious disease troubles of this character. Cotton, peanuts, peas, beans, potatoes, tomatoes, peppers and many other crops are seriously affected.

Surveys by the Florida State Plant Board have resulted in the finding of more than 500 centers of infection of spreading decline on citrus properties. The Florida State Experiment Station has demonstrated that spreading decline of citrus is associated with the burrowing nematode which works in the soil. In addition, a number of citrus and ornamental nurseries were found infested with the burrowing nematode. No certain method of stopping the spread of the decline is known at present. Its relentless advance at each center of infestation and the large number of relatively new areas of infestation indicate that this trouble is a real threat to the Florida citrus industry and perhaps that of other States.

Florida has appropriated approximately 1-3/4 million dollars for the 1955-56 biennium for survey and control work on the burrowing nematode and an additional \$90,800 to intensify research. The Florida State Department of Agriculture, with the cooperation of the Department, is conducting surveys to locate centers of infestation. The control programs, however, are without adequate research background to know what treatments will be effective. Research is needed on methods of freeing nursery stock of living nematodes, on testing nematocides, particularly those of low plant toxicity, and possible systemic poisons to destroy the nematode. All potential rootstock material needs to be treated for resistance to the nematode. In addition, basic biological studies on the burrowing nematode and the possible association of this nematode with disease factors needs to be thoroughly investigated. Increased Departmental participation with the Florida Experiment Station in conducting research work in all of these areas is needed to cope with this threat to the billion dollar citrus industry of Florida.

Departmental research on nematodes is now carried on at 12 field locations. Most of this work is in the South and Southwest. With the exception of field work recently initiated at Wisconsin and the studies on golden nematode on Long Island, no nematode research is carried on with crop plants in the North Central or Eastern United States. At present, no work is under way on a study of the nematodes responsible for decline on apple, cherry, plum, pecan trees, park and foundation planting where replant expenses are frequently heavy, and declining small fruits, such as blackberries, raspberries, etc. Some work is under way on nematodes attacking strawberries and peaches.

There is no active project in the Department on the control of soil-borne diseases as such, or those that might be caused by nematodes. Some work is being attempted incidental to study of control of soil-borne diseases of beans and peanuts, but these are not accompanied by the kind of studies needed on organisms living in the soil.

Plan of Work: An increase of \$26,000 was received in fiscal year 1956 for research on the burrowing nematode. This has made possible the initiation of limited studies to determine its life history and whether or not spreading decline of citrus is the direct effect of action by the nematode or is due to indirect factors associated with nematode action. A part of the proposed increase for 1957 would be used to expand research on the

burrowing nematode and on spreading decline. A three-pronged attack would be undertaken which would be coordinated with related work of the Florida Experiment Station. Attempts would be made to (1) devise methods of eradicating nematodes from nursery stock, (2) find or develop nematocides that can be used without harm to plants, including systemic nematocides, and devise effective methods of using them and (3) test all potentially suitable citrus rootstocks for reaction to burrowing nematode and select or breed, if possible, kinds of rootstocks that will resist the pest. Research would also be undertaken on other nematodes such as sting, stubby root, and dagger nematodes that attack citrus and cause tree decline, and on nematodes causing decline in other fruit trees, ornamentals, and small fruits.

The work on golden nematodes would be expanded to include biochemical studies of the causes of root attraction to this nematode, in order that the substance responsible for cyst discharge of eggs and larvae may be determined. Research would also be undertaken on the physiological, particularly metabolic, disturbances nematodes produce in attacked plants. Chemicals would be screened for use as nematocides that may prove effective in the soil without being toxic to the growing plants.

Additional research would be undertaken on nematodes found recently on rice and soybeans and on those that cause stunting of crops and weak growth of perennial grasses.

Teams of well-trained specialists in soil microbiology, plant physiology, plant pathology, horticulture or agronomy, and related fields would concentrate on one or two of the more serious troubles such as southern rot or southern blight caused by Sclerotium rolfsii. Controlled field, greenhouse, and laboratory studies would be required. Cooperation of other agencies would be encouraged.

(c) Increase of \$53,000 to continue research on cantaloupe disease and insect problems in the Southwest.

Problem and Need: A complex disease of cantaloupes and other muskmelons, called crown blight, has seriously reduced yields and quality of the crop in the Southwest in recent years, and it appears to be rapidly becoming worse. Melon districts of Southern California and of Arizona are especially hard hit. In 1955 it is estimated that yields were cut by a third to a half in important districts with crown blight the most serious cause of loss. Mosaic, curly top, powdery mildew, leaf hoppers and leaf miners also caused losses, complicating the crown blight situation. Crown blight is a symptom of adverse conditions not yet understood, but probably is caused by a combination of soil and soil moisture conditions, variety or strain, certain disease organisms, and possible insects as disease carriers.

Revenues of growers have rapidly decreased in the Southwest in the past three years, and for 1955 the losses are estimated at more than \$5 million. Losses on large acreages have been heavy because poor yields and poor quality have caused returns to fall far short of costs of production. Many large packing sheds have been forced to close and rail and truck transportation companies have lost valuable business.

Current research program: Until fiscal year 1956, the Department had available approximately \$44,000 for all research on breeding, disease, insect, and cultural aspects of melon production in the Southwest. Only a limited part of these funds could be devoted to the crown blight problem. The work is cooperative with the agricultural experiment stations of California and Arizona, but their work in this field is also on a modest scale.

Because of the urgent need for expanded research on crown blight and other disease and insect problems of cantaloupes, which became known after action on the 1956 Appropriation Act was completed, \$50,000 was transferred by the Secretary of Agriculture for fiscal year 1956 for such research from the subappropriation, "Plant and animal disease and pest control" under the authority of section 702(b) of the Department of Agriculture Organic Act of 1944. These funds have permitted a substantial intensification of the research program which is being conducted in cooperation with the California and Arizona agricultural experiment stations. The additional funds provided by this transfer are available, however, only for fiscal year 1956.

This expanded program must be maintained if rapid progress is to be expected in solving the breeding, disease, insect, and cultural problems responsible for the current distress of the melon industry in the Southwest.

Plan of Work: Cooperative field research would continue to be concentrated largely in the Imperial Valley of California and Yuma district of Arizona with supporting laboratory, field, and greenhouse studies at LaJolla, California and the Salt River Valley of Arizona. Skilled research crews would be moved from one cooperative location to another to aid in handling peak workloads at different points in California and Arizona.

Studies would be conducted in fields of good versus bad crown blight history; attempts would be made to produce the disease experimentally; melons bred for resistance or tolerance to crown blight would be tested widely under commercial conditions; studies would be made of the role of the leaf miner and other insects in causing losses directly or as insect vectors transmitting destructive disease organisms and practical measures for insect control would be developed; irrigation, fertilizer, and land management interrelations with crown blight would be studied by both survey and experimental methods. The possible role of soil-borne diseases would be studied. Periodic work conferences of the cooperating workers of all agencies would be held to assess progress and plan each season's coordinated activities.

(d) Increase of \$450,000 to establish a national seed storage facility for preservation of valuable stocks.

Need for Increase: Plant breeders, seedsmen, and others working with the development and production of agricultural crops are deeply concerned with the problem of maintaining valuable germplasm for use in future breeding programs. Most agricultural crop material can be held as seed.

If kept under optimum conditions of humidity and temperature, usually at low temperatures and low humidity, seed will remain viable for long periods, frequently many years, without the expense of producing a new supply of viable seed. Thus, a national seed storage facility is the most economical way to hold valuable plant material for the future. Close wild relatives and primitive varieties of our important crops with valuable breeding characteristics not to be found in our present commercial varieties are disappearing and cannot be recovered unless means are taken for their maintenance. For example, a study made a few years ago of the availability of clover introductions made since 1898 showed that only 1 out of every 50 clover lines introduced was still available. Nearly every seed producing crop has a similar history.

The cost of repeatedly exploring for and re-collecting, when possible, important breeding material is far greater than maintaining a viable stock once it is in hand. Lack of proper and adequate storage space is the principal cause of the complete or partial loss of many lines of plant breeding material held by the Department and the State experiment stations. Various small facilities at some of the State experiment stations provide temporary storage for a part of their crop plants, but there is no centralized seed storage facility in this country for the maintenance of germ plasm. In some few cases, an excellent job has been done of taking care of the seed collections of introduced lines forwarded to a scientist at an experiment station interested in working with a particular crop, but usually the collection has been dispersed and lost when the individual responsible for the collection retired or died.

The national need for perserving valuable permplasm was formally expressed in 1944 by the National Research Council. It has been given high priority by the Grain Advisory Committee, the Seed Advisory Committee, and the Vegetable Advisory Committee. The National Advisory Committee for the New Crops Projects also gives top priority to the facility and has had a subcommittee working on this problem since 1949. Many other organizations support a national seed storage facility.

Plan: It is planned to construct a one-story building, approximately 50 X 100 feet with approximately 12 independently controlled cold and humidity storage chambers, a machinery and control room, seed germination laboratory, seed cleaning room, noncontrolled general storage room, and necessary office space for the staff. A small greenhouse would be attached. It is anticipated that the facility would be constructed either on federally owned land or land made available to the government without cost. Since humidity is difficult to control, it is planned to construct the facility in the high and dry Rocky Mountain area of the United States preferably at some State experiment station where library facilities, professional advice, and at least a minimum amount of technical services are available. The annual recurring cost for maintenance and operations, supplies, and contractual obligations is estimated at \$100,000.

Estimate of Cost: The cost of constructing the facility is estimated as follows:

Plans and specifications	\$45,000
Construction of building including refrigeration, air conditioning, and built-in laboratory equipment	395,000
Supervision of construction	10,000
Total	<u>\$450,000</u>

(3) Increase of \$404,000 under the activity, "Entomology research", composed of:

(a) Increase of \$203,000 on the control of insects affecting livestock and insects reducing forage and range production.

To meet the needs for more efficient livestock production and lower costs of forage production, research should be expanded on the control of (a) insects, ticks, and mites affecting livestock, and (b) insects reducing forage and range production.

Control of Insects, ticks, and mites affecting livestock. The livestock population of the United States is estimated at nearly 200,000,000 including cattle, sheep, swine, and goats, and great increases are predicted in the next several years because of the constant improvement and expansion in grassland and irrigated pastures. Livestock are attacked by numerous species of ticks, mites, and insects. The progressive change from cropland to livestock agriculture will intensify a number of serious insect problems which can be overcome only by the development of better control measures. New grassland management practices such as irrigation and watering pond developments result in increases of certain livestock pests such as mosquitoes, horse flies, and deer flies. These pests reduce weight gains of livestock and milk production. One of the widespread pasture mosquitoes is a vector of equine encephalomyelitis, which affects man as well as animals. Horse flies and deer flies are believed to be important agents in the transmission of anaplasmosis. Light insect infestations can result in a measurable loss to the livestock grower, and gross infestations can markedly reduce his income. In addition, insect depredations and insect-borne diseases reduce the amount and quality of livestock products available as food for our country.

No satisfactory materials or methods are now available for the control of such important pests as horse flies, deer flies, stable flies, or cattle grubs. Cattle grubs cause annual losses estimated at 100 million dollars through loss in meat and milk production and damage to hides. Fairly satisfactory materials and methods are available for controlling house flies, horn flies, ticks, and lice affecting livestock, but the tendency of insects to develop resistance to certain insecticides casts doubt on the future effectiveness of current recommendations. Expanded research

to develop more effective materials and methods for controlling livestock insects is urgently needed to promote a more prosperous industry and thereby insure an adequate supply of meat for our fast-growing human population.

Plan of Work: The present screening and field testing programs to find new and more effective insecticides and repellents for the control of insects, ticks, and mites affecting livestock would be expanded. Special attention would be given to such work on stable flies, horse flies, deer flies, and horn flies. Efforts to find and develop systemic insecticides for the control of cattle grubs and other insect pests would be intensified. Research on biology and ecology of livestock insects in relation to new livestock management practices would also be conducted.

Control of Insects reducing forage and range production: Grassland agriculture provides over 50 percent of the feed for livestock and is of prime importance in soil conservation and improvement. With the reduced acreage allotments of cultivated crops, grassland farming is becoming more important. This expansion of grassland agriculture is bringing with it increased insect problems. The larger investments in grassland food production make the development of economical means of reducing losses caused by insects all the more essential. In outbreak years grasshopper and cutworms frequently cause total destruction of forage crops and range plants in some areas. The substantial losses caused by other insect pests of grasses and legumes such as white grubs, wireworms, root borers, aphids and leafhoppers are not generally realized. There are many kinds of soil insects that feed inconspicuously on plant roots and therefore have received little attention. There is need for research to develop methods of detecting damage by these insects in time to apply effective and economical control measures that also must be developed and evaluated.

Because of the rapid spread of the yellow clover aphid, now officially known as the spotted alfalfa aphid, and the heavy losses suffered by alfalfa growers, there is an urgent need to develop practical methods for its control. This aphid was first reported as causing serious losses of alfalfa in the United States in 1954 when it caused an estimated damage of \$5,000,000 in New Mexico, Arizona, California, and Nevada. It is now the most destructive alfalfa insect in the Southwest. In 1955 this aphid continued to cause widespread damage to alfalfa in these four States, and serious infestations also occurred in the States of Kansas, Arkansas, Oklahoma, Texas, and Utah. The aphid has great reproductive capacity and is a threat to all alfalfa-producing regions of the United States. In areas where it has become established, young alfalfa stands are destroyed or greatly reduced. On established stands the honeydew secreted by the aphid reduces the quality of the hay and may make it impossible to cut, dehydrate or bale. Insecticides now in use may provide immediate control but their short residual action does not prevent damage from reinfestation and several applications may be necessary for a single cutting. This

greatly increases the cost of growing the crop frequently by as much as \$10 to \$15 per acre. Lady beetles feed on spotted alfalfa aphids, but have little effect in controlling them on alfalfa early in the season.

Until the recent outbreak, the Department had not been conducting research on the spotted alfalfa aphid although it had conducted some research on closely related aphid species. During the past year, it has made such temporary shifts in program as were possible to endeavor to meet this emergency. These shifts have permitted the initiation of cooperative research in Arizona, California, and Kansas to study the biology, ecology and natural enemies of the aphid, to test new insecticides useful for its control, and to develop desirable alfalfa varieties having resistance to the aphid. The Entomology research station in Europe has been asked to search for natural parasites and predators of the aphid in that region which might be introduced into this country for control purposes. The measures which it has been possible to take, however, are inadequate for a research program of the scope needed to meet this urgent problem.

Plan of work: The increase would be used to strengthen the work on the spotted alfalfa aphid now being carried on in cooperation with State experiment stations and to strengthen the search for parasites and predators. Specific lines of work to be expanded would include:

- (1) Search for and development in cooperation with plant breeders, of alfalfa varieties resistant to the spotted alfalfa aphid. An expanded program would permit more intensive testing of early generation crosses between the resistant alfalfa varieties that have been found and varieties that are adapted to the areas of aphid infestation.
- (2) Expand the search for parasites, predators, and disease pathogens, for use against the spotted alfalfa aphid, and increase facilities for rearing and distributing them to the infested areas.
- (3) Expand research on the biology and ecology of the spotted alfalfa aphid including studies to determine the causes of population fluctuations.
- (4) Evaluate new chemicals, especially systemic insecticides to find more effective and less hazardous insecticides for control.

Expansion of research on other grassland insects would include identification of the injurious species, their distribution, damage and biology, and development of practical means for their control. The testing of new chemicals to develop insecticides that are highly effective against insects destructive to grasses and legumes, economical to use on grasslands, and safe to animals and man would also be expanded. Special attention would be given to such studies on cutworms, armyworms, grubs, grasshoppers and leafhoppers.

(b) Increase of \$75,000 to expand research on the control of the boll weevil, pink bollworm, and other cotton insects.

Need for Increase: The boll weevil has developed resistance to the widely used chlorinated hydrocarbon insecticides in localized areas and caused farmers in these areas to suffer tremendous losses in 1955. Other cotton pests that have developed or are suspected of developing resistance to insecticides are spider mites, the salt-marsh caterpillar, the cabbage looper, the cotton leafworm, thrips, lygus bugs, and the cotton aphid. If these insects should develop a high degree of resistance to recommended insecticides over the Cotton Belt it could mean economic disaster to cotton growers in the absence of satisfactory substitutes.

The development of satisfactory insecticides and methods of using them are urgently needed for control of early-season insects, including overwintering boll weevils. Substitute insecticides are also needed to control resistant boll weevils and some of the other insects. As a result of research during the past few years in devising a simplified method of treating gin trash and by-products of cotton seed at oil mills, oil millers and ginners in the pink bollworm quarantined areas have been saving over one million dollars annually. There is need for further reduction in costs of meeting quarantine requirements for the pink bollworm, especially in eliminating heat sterilization of cottonseed at gins, in reducing and holding field infestations down below the damage point, and in preventing the spread to new areas.

Plan of Work: The proposed increase would be used to:

(1) Determine (a) the extent to which the boll weevil and other cotton insects have already developed resistance to the currently recommended insecticides; (b) the possibility of future generations acquiring resistance under continuous exposure to insecticides; and (c) whether resistance to one insecticide or a group of insecticides will carry over to other organic insecticides.

(2) Discover and develop new insecticides to be applied as dusts or sprays in the conventional manner to substitute for the chlorinated hydrocarbons.

(3) Expand and maintain research on the pink bollworm to: (a) develop more effective and economical insecticides and machinery to reduce field infestations; and (b) destroy the insect at the gin more economically.

(c) Increase of \$126,000 to intensify research on insecticidal residues to develop recommendations for the safe use of insecticides on food and feed crops.

Need for Increases: Insecticides in general are the most practical weapons that we have to combat the ravages of insects that annually destroy about \$4 billion worth of food, feed, and fiber crops. However, the possible presence on harvested crops of residual amounts of insecticides which may be harmful to humans or animals presents a problem of major magnitude. The importance of this problem is evidenced by the recent enactment of Public Law 518, an amendment to the Food, Drug, and Cosmetic Act which requires that certain raw agricultural commodities be free of pesticides or, if pesticides are necessary for their production, that the amounts present fall within limits prescribed by the Department of Health, Education, and Welfare and are known to be safe from the viewpoint of human health. Responsibility is placed upon the Department of Agriculture for certifying the necessity for use of specific insecticides upon particular crops before the limits of tolerance can be legally established.

As a result of this law and the interpretations of it recently issued, it will be necessary to furnish extensive data on insecticide residues for consideration by the regulatory and health authorities before insect control recommendations can be made. Although the larger manufacturers of insecticides will be able to supply a part of the residue data needed for their new products, confirmatory information will be required from the Department. In many instances manufacturers of insecticides for which the potential demand will be small but which are vitally needed for the control of important pests will not feel justified in carrying out the research required on residues and the full burden of such research will fall on the Department.

A number of new, highly effective insecticides are being discovered each year but research on residues has not been adequate to obtain necessary information to permit their rapid development for controlling destructive insects on many food and forage crops.

Because of all of these demands and the Department's responsibility to meet them, expansion of research to determine the extent to which insecticide residues may occur on agricultural commodities is urgently needed.

Plan of Work: Potential residue hazards would be determined for each pesticide, and spray schedules developed to avoid residues in excess of allowable tolerances. Chemical and bioassay methods would be developed for the determination of minute quantities of each new insecticide so that residue determinations can be made. Field studies would be undertaken to ascertain the extent to which various chemicals accumulate in the soil and as residues on crops, including possible translocation to parts of the plants consumed by man and animals. Because so many crops are involved it would be necessary, in order to expedite the work, to devise

sampling techniques that would provide true results from minimum numbers of samples. The increase would be used to strengthen the chemical research in Georgia, Indiana, Maryland, New Jersey, Texas and Washington where there are established chemical laboratories, and to bolster field studies in other States where insecticides are investigated to control crop pests. It is estimated that the State experiment stations are expending annually about the same amount as the Federal government on insecticide residue studies.

(4) Increase of \$1,055,000 under the activity "Soil and water conservation research" composed of:

(a) Increase of \$950,000 for research to assist in farm adjustment and soil and water conservation by development of lower cost practices in soil and water management.

Need for Increase: An immediate expansion of soil management research is needed. The farmer should have information enabling him to manage land in such a manner as to fit in with a nationwide program of attaining maximum soil and water conservation. The prevalence in recent years of floods, droughts, and dust storms testifies to urgency of this goal.

Land must be protected and improved for future use. Under nature, soil building is slow, even with desirable vegetation. The maintenance of a balanced environment for plants and soil microorganisms, however, might result in a more rapid soil build-up which would have long lasting beneficial effects once the land was returned to crop production. It is proposed, therefore, to initiate research to establish sound principles of soil building; to determine and evaluate the effects of various liming, fertilizing, plant residue, and other management practices over different periods of time upon long-time soil productivity, and upon the value to subsequent crops; and to develop sound recommendations on soil-building practices for various climatic and soil conditions.

More adequate hydrologic data are needed at the earliest possible date for the Department's rapidly expanding programs for development and control of the Nation's water resources. Many millions of dollars are spent annually on these programs. Hydrologic research is needed to guide them in their operations to avoid costly mistakes. There are practically no hydrologic data for some parts of the country, for example, the Southeast, New England, and most of the West.

Research is needed to develop information on (a) how the behavior of water in various soils and land forms responds to different crops and management practices; (b) more efficient and economical ways to keep runoff water from causing excessive flood and sedimentation damage; (c) how to locate and control sources of silt and sand that are deposited in stream channels and reservoirs and on fertile farm land; (d) perfected and generalized designs for conservation structures that will be used in large numbers in the watershed and other phases

of the soil and water conservation program. There is also need for cooperative economic evaluation of various alternative watershed practices to supply information that will guide programs toward the maximum, long-range economic return to the individual and to the area.

Current tillage practices are bringing about compacted layers, or traffic pans, which interfere with root and water penetration. There are indications that research on minimizing tillage will show that crop yields may be maintained even though tillage operations are reduced as much as 50 percent. Extensive on-the-farm research is needed to point the way to a proper balance of low cost farm practices.

There can be an enormous increase in efficiency of water use and water conservation. In the irrigated valleys of the West, some systems have been found to be only 30 percent efficient in distributing water to crop plants. There is under way a tremendous increase in supplemental irrigation in the Eastern States with a minimum of background information on the wisdom and effectiveness of the installations. Research on supplemental irrigation, especially towards coordinating it with other soil management practices is urgent. Development of less expensive and more efficient water control structures which the farmer can install for field draining and for reducing soil and water losses is needed. Improved methods of controlling erosion are needed to protect against the in-place losses of soil and fertility and the downstream damages when sediment fills ponds and drains making them ineffective.

Large public expenditures are being made for land and water development, for conservation practices, and for flood control and there is great need for intensifying research to provide more adequate information on soil and water management practices to assure wise expenditure of these funds.

Plan of Work: Hydrologic research would be initiated at new locations in the Southeast, New England, and the northern Great Plains which have been identified as the areas of greatest need. Hydraulic engineers and aides would establish and place under measurement small watersheds for studying the effect of varying land use and management under differing physiographic-climatic conditions. The work would be cooperative with state agricultural experiment stations which would furnish and manage the land under study.

Existing hydrologic research work would also be strengthened. The analysis and publication of accumulated hydrologic data would be accelerated by the addition of trained analysts and computers at existing locations so that the data would become available to the Soil Conservation Service and other using agencies at an earlier date. Sedimentation studies would be strengthened in Mississippi, New York, and Missouri River Basin states. Research at the St. Anthony Falls, Minnesota, laboratory on the development of improved hydraulic structures would be strengthened.

Other fields of research which would be strengthened would include:

1. Building reserves of soil productivity for future use.

2. Increasing efficiency in the distribution and use of irrigation water in the Eastern states.
3. Improving soil conditions resulting from compacted layers, or traffic pans, and studying the possibility of decreasing tillage operations without reducing crop yields.
4. Development of the most effective, low-cost methods for draining water from comparatively flat lands so as to avoid the costly delays due to inability to use farm machinery on wet lands.
5. Improvement of methods for controlling erosion and run-off, including improvement of terracing operations and stabilizing of waterways and terrace outlets.
6. Increasing the efficiency of farm operations through improvement of land and water conservation in irrigated areas of the West.
7. Development of effective and economical methods of converting saline and alkali lands in the Western States to grass and forage cover, including studies on salt tolerance of forage crops to ascertain their usefulness on such soils.
8. Determination of the effects of minor element deficiencies and the prevalence of toxic substances in soils upon the growth of grass and forage cover, including the nutritional value of the forage to grazing animals.
9. Investigation of the microbial population in soils associated with the roots of grasses and other forage crops and the relationship of the root activity and soil microbes to the development of good soil structure.

Most of the work would be conducted in cooperation with state experiment stations.

(b) Increase of \$105,000 to intensify research on water conservation and wind erosion control and for relief of emergency conditions in the Great Plains wheat areas.

Need for Increase: Dryland farming areas of the Great Plains comprise the most hazardous agricultural areas of the United States. At times moisture is deficient for crop production in all areas. Cycles of drought, involving relatively low precipitation, high temperatures and wind movement, have caused recurring disaster conditions. Dust storms resulting from droughts and occasional torrential type rainfall continue to remove the more fertile portions of wheat producing soils. During the past five years, the seriousness of the wind erosion problem has steadily increased, encompassing widely scattered areas of the Great Plains. In fact, dust storms were so severe in the spring of 1954 and again in 1955 that disaster conditions were declared in the Central and Southern Great Plains.

Emergency appropriations for assistance to farmers and ranchers in wind erosion control measures have provided temporary relief, but similar emergency measures will be a recurring probability so long as problems of erosion control and cropping adjustments remain unsolved. Closely associated with the control of wind and water erosion is the problem of devising alternative uses for land diverted from wheat and other cereals because of surplus supplies of these crops. Developing farming systems for diverted acres which will embody better moisture conservation, control measures for wind erosion, and maintenance or improvement of soil productivity in the Great Plains is one of the most pressing issues facing agriculture today.

Research has shown that the key to wind erosion control is the maintenance of cover on the land throughout the year. The effectiveness of this practice, however, has not been fully realized because of gaps in our knowledge of how to make best use of it. Added emphasis should be directed toward determining the amount of cover needed for effective erosion control for each climate-soil complex; farming and tillage methods that will maintain adequate residue on the surface of the land; tillage, crop, fertilization, and conservation practices that will make maximum use of precipitation and soil moisture for grain, forage, and crop residue production; planting density and spacing of crops in relation to maximum protection and yield; and developing cropping systems, including grasses and legumes, and management practices for each climate-soil complex that can be used to replace conventional small grain farming operations with a view to improving soil productivity, abating erosion, and conserving soil and water resources.

Research in this field was strongly recommended at the meeting of the Great Plains Agricultural Conference at Denver, Colorado, May 31-June 2, 1955, which included the Governors of eight States, agricultural workers, and Department representatives. This group made the following recommendations for research:

In the areas which are physically adapted for continuous crop production, research should be directed toward stabilizing and improving the soil, the crop yields and the income expectancy, and toward building reserves to carry over the drought years.

In the areas with soils unsuited for arable farming, intensified research is needed to guide transition into grazing and livestock, and to prevent recurrence of distress caused by cropping unsuitable land in high rainfall years.

Research on the wind erosion problem of the Great Plains was given top priority in the 1955 Soil Conservation Service Research Needs Reports. It was also recommended in the reports of the Department's Research Advisory Committees on (a) Soils, Water, and Fertilizer, and (b) Farm and Home Equipment and Structures and by others.

Plan of Work: The research under this increase would be planned and conducted in cooperation with the State agricultural experiment stations of the region. To meet the needs listed above, it is proposed

to strengthen the work at approximately seven existing locations in Colorado, Kansas, Texas, New Mexico and Oklahoma. These locations are distributed throughout the part of the Great Plains where drought and wind erosion problems are most acute.

The first line of attack would be to obtain information on factors affecting the minimum amount of cover required to prevent wind erosion and on the nature and extent of water losses through evaporation and runoff from soils. This would include research on the effect of soil characteristics, and velocity and duration of wind on soil and moisture content as they relate to minimum cover required to stabilize the soil against movement by wind. Research would also be conducted on the use of chemical as well as physical methods to determine ways and means of reducing the large annual loss of water by evaporation. The field research program would be expanded to provide for field trials in cooperation with the Soil Conservation Service operations and State agencies throughout the problem area using results obtained from the basic studies.

(5) Increase of \$323,545 under the activity "Agricultural engineering research" to reduce livestock production costs by mechanizing livestock operations and the production of livestock feed, including research on the expanded use of electric power on farms.

Need for Increase: The improvement of farmstead operations is one of the most promising areas for research to cut farm costs and reduce labor requirements. Work done in service buildings and service areas accounts for almost one-half of all the man-hours used in farming. A very large part of these operations are directly related to dairy and livestock production. In 1954, the labor requirement for livestock production (exclusive of horses and mules) amounted to 5.7 billion man-hours, or more than 38 percent of all farm work. The nature of livestock production is such that all but a small part of that staggering total of man-hours of labor is spent at or near farmsteads.

One of the most limiting factors on the earnings of a dairy, livestock, or poultry farmer is the number of cows, hens, or other animal units cared for by one man. The development of means and methods of doing mechanically more of these farmstead operations to permit greater productivity per worker would greatly improve the profits of these farmers.

Applications of mechanical power and energy to the operations and processes in farmstead, service buildings and service areas have lagged far behind the mechanization of farm field operations. The relatively slow advance has been due in part to the nature of the work, but also because until very recently, suitable forms of power and energy have been lacking. Now, however, central-station electric power is available to about 93 percent of the farmers in this country.

Because of the great variety in farmstead operations and processes, there are numerous areas where research could reduce the costs of operation. Most operations have some common characteristics, i.e., they are repetitious, with each cycle being repeated on many days of

the year; they are confined to relatively small areas; they require some input of energy for conveying, metering, or positioning materials, and for conditioning materials or products for use or storage on the farm or prior to sale from the farm. The magnitude of the "materials handling" problems is indicated by the fact that an estimated 22 tons of material per year must be handled for each high-producing dairy cow. For a 20-cow herd, the average would be more than one ton of materials every day of the year. Farmstead operations and processes with these common characteristics are especially susceptible to improvement through electrical equipment and controls.

The development of improved mechanical methods for handling materials would lead to reorganization of farmstead operations for greater efficiency. Research is needed to discover time-saving and labor-saving methods and equipment for moving large volumes and weights of hay, silage, grain, litter, and manure. This is particularly important for dairy production, since the labor requirements of dairying are considerably greater per dollar of gross income than for other types of livestock. It is estimated that 18 percent of all farm labor is performed on dairy herds alone. If research could eliminate 1 percent of the hand-labor involved, more than 27 million man-hours per year could be saved.

To aid in lowering livestock production costs, research is also needed to develop low cost but adequate fencing, water supply, field shelters, supplementary feeding structures and equipment for handling livestock, with special emphasis on ways and means of reducing the labor required in livestock production. To lower the costs of producing livestock feed, there is also need for the establishment, fertilization, and maintenance of pastures at minimum cost.

Costs of livestock production are materially affected by water supply, field shelters, and feeding and housing equipment and structures. This is particularly true of areas with relatively long hot summers and low rainfall. Extensive field testing is required to transfer to varying field situations the laboratory data being obtained by current research on the effects of environmental factors such as temperature, humidity, and air movement on animal health, development and production.

New and improved equipment and methods must be developed for harvesting seed of many grasses to make possible lower cost production of forage crops for livestock use. Some of the best adapted grasses for pasture, forage, and conservation use, present unusually difficult harvesting problems. To reduce forage production costs, more effective equipment also must be developed for seeding and accurate fertilizer distribution and placement for the various regions.

Plan of Work: All phases of this research will be cooperative with appropriate soil, plant, and animal scientists and economists in State and Federal agencies.

Research to reduce labor and cost of caring for livestock will be conducted in cooperation with a State Agricultural Experiment Station in the Northeast, the Middle West and the West. Attention will be given to work requirements of typical individual enterprises, development and adaptation of buildings and equipment and to the functional design and arrangement of the farmstead as a whole to reduce the work load. Principles of good arrangement and farmstead organization will be developed suitable for use by individual farmers.

Cooperative research on the more effective and extensive use of electric energy to reduce the cost of farm operations will be emphasized. Specific problems to be studied will include (1) improvement of electric fence systems to give more dependable and safe operation and to be more readily used in an expanded pasture program, (2) mechanizing the handling of large volumes and weights of hay, silage, bedding and grain, (3) the effective mechanizing of the feeding of grain and roughage to all classes of livestock including poultry, and (4) developing reliable but lower cost equipment for farm milk cooling and handling.

Research to improve summer conditions for livestock in southern areas will be expanded in the Southwest and initiated in the Southern Great Plains and the Southeast. This research will include studies on the use of shades, air movement, water and other cooling devices and on the development of the most effective and lowest cost forms of these facilities.

An adequate, dependable supply of water is an essential for any livestock program as well as for satisfactory farmstead living. Research in cooperation with the U. S. Public Health Service will be initiated to develop effective and low cost filtration or other treatments for areas where only surface or unsuitable ground water is available.

Research being conducted at Corvallis, Oregon on the equipment problems of harvesting, cleaning and farm handling of the common grass seeds will be expanded to include work on the harvesting and cleaning of the difficult-to-handle seeds of special grasses produced in the western dry land regions. Research on similar problems in the Southern Great Plains will be initiated. Research on the engineering and equipment phases of the establishment and maintenance of grassland will be initiated in the Southeast, Southern Great Plains and the Northwest. The cooperative studies now under way on the engineering phases of grassland culture in the Mid-Atlantic and Northeast States will be expanded as will be the limited basic work now being done in the Southeast on the engineering requirements for the effective and economical drying and farm storage of grass seeds.

(6) Increase of \$872,000 under the activity, "Production economics research" composed of:

(a) Increase of \$350,000 to provide economic guides to farm production adjustments and soil and water conservation by research on farm costs and returns and on water management.

Need for Increase: Prices received by farmers have declined one-fourth since 1951, but prices paid for goods and services used in production are about the same as 4 years earlier. These cost-price changes have varied greatly among farmers producing different commodities and located in different farming areas. The cost-price squeeze has brought urgent requests for production cost analyses and income information by farming areas, and also for information on how farmers individually and as groups have responded or can be expected to respond to changing economic conditions and to present or proposed Government programs.

To appraise the problems facing farmers as a result of these changes and to provide economic guides to farmers and for farm program development and evaluation, it is necessary to know the effects on farm production, income, and costs by types of farms in different farming areas, by sizes of farms, and by major enterprises on these farms of (1) changes in price-cost relationships, (2) changes in technology, (3) changes in farm programs, such as acreage allotments or programs promoting shifts from cropland to pasture, and (4) other factors affecting farmers' production decisions. Economic research is needed to determine the responses in production that can be expected for farmers in different situations with respect to financial condition, indebtedness, tenure, size and type of farm and other factors. Both short and longer-term production changes need to be analyzed. Such analyses would supply badly needed information on changes in costs and returns for important types and sizes of farms and would provide the basis for gauging the effects of alternative program proposals on agricultural production and incomes by types and sizes of farms, on the production of different farm products by regions, and for the country as a whole.

Research is also needed to provide a sound economic basis for selecting and establishing desirable watershed projects and programs and to provide information to farmers on investment requirements and probable costs and returns from irrigation in the humid regions and on problems related to water rights and other legal problems in water use. Little is known regarding the present extent or possible future significance of irrigation in humid regions. Information is needed to determine the investments in irrigation that are justified by increased yields and under what economic and other

conditions net returns to the farmer will be increased. Studies are needed in various areas to determine installation costs on different sizes and types of farms. Cost of installing, operating, and maintaining irrigation equipment, special farm management and land use problems arising out of irrigation and its relative advantages under different weather, price and cost conditions need to be investigated.

A vital need exists for expanded economic evaluation work on many phases of watershed projects. Research is needed on the functions, powers, and financial management problems of local watershed organizations which will administer the watershed program. Few States now have adequate enabling legislation for the establishment of effective local districts. Economic analyses and interpretations are needed of the physical results of research in hydrology, sedimentation, inundation and erosion now being carried out at various field locations. The economic effects of watershed management practices should be measured.

Research on water laws and regulations needs to be expanded to supply information on the economic implications of the prevailing legal status of water rights and regulations, and to indicate changes necessary to induce effective individual and group action. Such research will help to meet the need of farmers, local, State and Federal agencies and others for information and guidance in meeting legal problems of water management.

Plan of Work: The increase would be used to develop additional series on costs and returns for such types of farms as irrigated cotton farms in the Southwest, poultry farms in the eastern States, irrigated farms in the West, general farms between the Corn Belt and the Cotton Belt, dairy farms in the Southeast, and fruit farms in several regions. The basic series on costs and returns by type of farm have been developed in cooperation with State Agricultural Experiment Stations, and work done under the expanded program would also be undertaken cooperatively. Statistical series of costs and returns by type of farm for the period 1930 to 1954 have been developed and are being maintained annually for 21 types of commercial wheat, cotton, dairy, corn, livestock and tobacco farms in important production areas. Other series dealing with cotton-peanut farms in the Southeast, commercial cotton farms in the Mississippi Delta, dairy farms in southern Minnesota, cattle and sheep ranches in the Southwest and wheat farms in the Southern Plains are being prepared.

Production cost analyses would be made for important commodities by major producing areas to measure the changes that have occurred in costs, to analyze the reasons for such changes, and to determine the effects of technological developments on efficiency and production costs. Appraisal would be made of the factors that determine production responses made by farmers to changing price-cost relationships, to changes in technology and to changes in farm programs, with particular emphasis on determining the conditions under which farmers make adjustments in production in different situations with respect to financial condition; degree of mechanization, tenure, and size of farm. Special studies would be made to evaluate the factors influencing farmers' decisions to adopt new methods of production and farming systems. Estimates would be prepared

on the overall effects of potential changes in use of fertilizer, machinery, and other production goods and services on farm output and the current and prospective effects of changing price-cost relationships, technological developments, farm programs and other factors on farm production and income.

Research to develop needed information on water management would include:

(a) Compiling information on the extent of use of irrigation in the humid regions; making studies in selected areas to determine installation costs on different sizes and types of farms, and the cost of operating and maintaining irrigation installations; appraising the special farm management and land use problems arising out of the practices of irrigation; and evaluating the relative advantages of irrigation under different weather, price and cost conditions. These analyses would determine the conditions under which irrigation is likely to be profitable and would appraise the economic significance of existing and potential development.

(b) Developing improved evaluation techniques and procedures to be used in planning economically sound watershed projects; analyzing and interpreting the physical results of research in hydrology, sedimentation, inundation and erosion now being carried out at various field locations in order to determine the economic effects of watershed management practices; providing a measure of the long-term results of watershed programs; and studying the experience of various types of resource improvement districts in handling problems encountered and ways and means of assisting farmers to overcome obstacles in applying recommended practices on their farms.

(c) Reviewing laws relating to water rights and to water use and control in the 31 Eastern States; investigating in selected States the economic implications of the application of such laws, including authorized and established types of district organizations and functions; analyzing the need for clarifying water rights and improving the legislative authority of resource districts; and appraising alternative legislative remedial programs.

The work would be carried out in cooperation with the State Agricultural Experiment Stations, other State agencies, and with the Soil Conservation Service and the Office of the General Counsel in the Department.

(b) Increase of \$192,000 to expand research on the economic problems of adapting farming to the hazardous conditions of Great Plains agriculture.

Problem and Need: Farmers in the Great Plains are faced with unusually wide variations in incomes from year to year because of extreme fluctuations in crop yields. Good years and bad years tend to come in groups. Conditions created by several years of drought in the "Dust Bowl" area of the Southern Plains focus attention on the critical nature of the problem. These conditions can develop in any part of the Great Plains region, which includes about one-sixth of the area of the United States.

Many farms are too small to provide a satisfactory income except in very favorable years and in periods of high prices. They are too small to give the farmers a chance for flexibility of operation and to build up adequate reserves to meet periods of adversity. Even with farms of adequate size and adapted to the area, farmers have difficulty in maintaining the farm business as a going concern because of dust storms, drought, and low incomes.

Increased research is urgently needed to provide information to help farmers adjust sizes and types of farms and financial and business methods to achieve satisfactory incomes and to survive periods of drought and other adversity. It is also needed to provide a sound economic basis for government and local programs designed to achieve adjustments in Great Plains farming that are needed to meet changes in demand for wheat and cotton, emergency or recurring drought conditions, and the requirements of conservation and soil management.

The analysis of long time reliable data on the nature and frequency of the drought hazard in the various areas is the first requisite for intelligent action by farmers themselves, as well as by agencies serving farmers. There is urgent need for research in cooperation with the Weather Bureau and other agencies to determine the incidence of drought in different areas of the Plains, and to relate drought incidence to crop yields on different land classes and with different farming practices. Such research would provide a basis for adjustment of farming to weather hazards. It also would furnish data for further adaptation of crop insurance to serve as a more important protective device against crop losses and losses of income.

Research also must be undertaken to determine the sizes and types of farms best adapted for different areas of the Plains. This research would bring together the results of past studies and the experiences of farmers in order to analyze investment needs, operating costs, and income possibilities of different sizes and types of farms. Such research is essential to a sound adjustment, and credit program in all areas. Equally important is the determination of the most effective ways of surviving drought when sizes and types of farms are adapted to conditions found in each area. This includes studies of effects of taxing systems on land use; adjustments in tenure and credit programs; and provisions for financial, feed, and livestock reserves.

Solutions to some of the problems of Great Plains agriculture can be accomplished only by group action at local, State and regional levels. The opportunities for use of zoning, easements, protective covenants, grazing and soil conservation districts, wind erosion districts, and other devices to guide desirable land and water use need to be more fully explored.

Plan of work: Research on these various problems would be conducted at Federal stations and in cooperation with State experiment stations. The work would include laboratory and field trials. Basic and applied research would be expanded and new projects undertaken. In a number of cases preliminary laboratory work has already pointed the way to applications of research which can be expected to produce beneficial results in a relatively short time.

(6) Increase of \$225,000 under the activity, "Animal and poultry husbandry research," to construct a modern, centralized poultry brooder house at Beltsville, Md.

Need for Increase: New poultry brooding and rearing facilities are needed to replace obsolete and deteriorated facilities at the Agricultural Research Center at Beltsville, Md. Not only are the present facilities out-of-date, but they are in such a state of dilapidation that moneys spent on repair and rehabilitation must be repeated year after year without any tangible result. A new centralized brooder house is urgently needed to replace one old brooder house and 102 antiquated colony houses. The colony system of brooding has long since been discarded by practical, progressive poultrymen. This replacement represents about 25 percent of the poultry housing required for current work at Beltsville. Hundreds of progressive poultrymen visit the station annually and their confidence in the experimental work is impaired materially on viewing the present outmoded facilities.

New facilities would make it possible to reduce environmental influences which complicate and retard progress in poultry research. Present facilities are so outmoded and lacking in uniformity that differences in stocks due to variation in brooding and rearing are excessively high and may obscure the genetic differences sought in breeding research. In nutrition research an abnormal amount of replication of work is required in order to cope with the experimental error inherent in using present facilities. New facilities would result in savings in labor and other operating costs which would be applied to increasing the quality and efficiency of the current research in breeding, nutrition, physiology, and management. Output per man would be substantially increased.

Plan for Building: A two-story masonry building, 30 X 300 feet, would be constructed at Beltsville, Md., with an annual capacity of 25,000 day-old chicks for use in poultry breeding and nutrition research. It would be designed to provide uniform environmental conditions essential to the research program, with better means of preventing or controlling diseases and preventing losses from predatory animals.

Estimated Cost: The cost of the building is estimated as follows:

Construction of centralized brooder house	\$207,000
Plans and specifications	13,000
Supervision of construction	<u>5,000</u>
Total	<u>\$225,000</u>

(8) Increase of \$200,000 under the activity, "Human nutrition research" for research on the nutritive value of livestock products.

Need for Increase: More complete information on the nutritive value and cooking quality of livestock products would assist producers in putting on the market the kind of product wanted and needed by the consuming public of today. Research is needed to provide improved data on the nutritive value of cooked meat and the edible yield of cooked meat and to define the desirable range of fatness in beef, pork, and lamb, that will result in acceptable cooking and eating quality. Although fatness in meats has long been associated with superior market grades and with flavor and tenderness in cooked meats, excess fat has been objectionable to the consumer because of expensive shrinkage and losses in cooking, and waste in plate discard. In addition, excess fat has recently become a matter of medical concern because of the possible implications of high fat diets for impaired health.

Data on the composition and nutritional quality of the kinds of meat that are desired by consumers would assist specialists in revising market grades of meat and would assist farmers in using feed resources to produce more animals of the types that would increase the supply of protein and other nutrients needed for improved diet quality. Such data would assist nutritionists and food economists in determining nutritive value in relation to cost and the potential importance of meat products in human diets. The data would also aid the Department in revising basic nutritive value tables for use in diet planning and in the appraisal of food consumption levels of different population groups.

Plan of Work: To obtain more complete information on the nutritive value of livestock products, the cooking quality of beef, pork and lamb of different market qualities and degrees of fatness would be investigated and analysis made of the cooked products. Edible yield, shrinkage, cooking losses and eating quality would be determined for various cuts of meat prepared by the most suitable household methods using modern equipment. Analysis of the meats as cooked would be made for content of known important nutrients including protein, fat, amino acids, minerals and B-vitamins. Similar laboratory analysis for content of nutrients would be made of common processed and ready-to-serve meats and meat products as marketed and as served. Details of the research would be planned, and work conducted cooperatively with production, processing, and marketing specialists of the Department and other competent research agencies concerned with these problems.

(9) Increase of \$124,300 under the activity "Household economics research" composed of:

(a) Increase of \$50,000 for research to determine needed shifts in food consumption and to strengthen nutrition programs.

Need for Increase: Although food consumption is at a high level in the United States, there is continuing evidence that many families have diets in need of nutritional improvement. Many of these families would benefit by consuming larger quantities of milk, meat, fruits, and vegetables. It is difficult to reconcile such underconsumption with Agriculture's capacity to produce these foods.

Up-to-date appraisals of the nutrition situation should be made continuously so as to provide guidelines for adjustments in agricultural production, nutrition education and food management to meet the nutritional needs of the population. Agricultural and educational organizations are both concerned with identifying the groups in the population that have diets most in need of improvement in order to make recommendations that will result in better diets and more efficient use of the food supply. Specific and up-to-date information on the extent and nature of these nutrient shortages is needed to provide the basis for programs to accomplish shifts in food consumption. Efforts should also be directed toward narrowing the gap between publication of research findings and the general acceptance and adoption of practices that will provide better diets.

Plan of Work: Continuing investigations would be made in order to appraise the nutrition situation, to identify the specific groups in the population that have diets most in need of improvement and to estimate their food needs. Special attention would be given to population groups known from earlier research to be likely to have poor diets, such as low-income families, large families with teenage children, recipients of old-age benefits, or unemployment compensation. Interpretation would also be made of available food consumption data (such as those provided by a survey made in 1955) with special attention to determining the characteristics of groups that are low consumers of such foods as milk, meat, fruits and vegetables. After determining the extent and nature of nutrient shortages, and the groups of people most affected, needed shifts in food consumption would be estimated and programs would be suggested to accomplish these shifts.

The work of the Nutrition Programs Service, which is concerned with all Federal agencies having programs related to nutrition or school lunch and with the organized State and City nutrition committees, would be accelerated in order to narrow the gap between the research publication and popular adoption of results. Research findings would be made available through this service to nutrition workers and home economists in educational and other programs throughout the country. Periodic Nutrition Institutes would be held for leaders in all phases of nutrition programs to call attention to shifts in food consumption that are needed for nutritional improvement and for effective use of the nation's food supply.

(b) Increase of \$74,300 for research to help farm families in low-income areas improve their living through more efficient use of family resources.

Need for Increase: The contribution of home economics to the rural development program is limited by lack of timely research data on family economics and home management. Especially needed are (1) up-to-date facts on living costs for families on small-scale and part-time farms and (2) guidelines for choosing between the purchase and home production of food and other goods. Such data would provide

better understanding of the provision to be made for family needs in administrative plans for farm development and financing, and would also be used by the Extension Service and the Farmers' Home Administration in helping families develop their plans for better use of their resources.

Plan of Work: Cooperative projects would be developed with home economists in land-grant colleges in pilot areas where the rural development program is undertaken. Surveys of farm families would provide the needed data on cost of food, clothing, home maintenance and other items of family living. Current levels of living on small-scale and part-time farms would be evaluated and possibilities examined for better use of income and household labor in meeting family needs. For example, comparisons would be made of costs of alternative methods of obtaining their food supply, such as homeproduced or purchased food, and of meeting needs for clothing and other goods. Analyses would be made of the food consumption patterns and nutritional quality of diets of low-income farm families in relation to sources and methods of obtaining their food supplies.

(10) Increase of \$460,000 under the utilization research activity, "Cereal and forage crops," for the development of improved food, feed, and industrial products from wheat and other small grains, and forage.

Need for Increase: The supplies of wheat, oats, barley, rice and sorghum grains are at record levels due to combinations of high yields, record carryover stocks, and large acreages. Per capita wheat consumption has been declining for many years. Expansion of research to develop new food, feed, and industrial products from these grains offers great promise for increasing the markets for them. Wheat gluten is unique among all vegetable proteins for its elasticity, extensibility, and strength. Expansion of research on the chemistry and transformations of wheat gluten and on soft wheat flour components would lead to greater use of wheat in both feed and industrial products.

Sorghum, barley, and oats are frequently used to replace other grains in reduced acreage programs. Development of basic data on composition and preservation of quality, with emphasis on the nutritionally and physiologically important factors, such as vitamins, growth factors, pigments, etc. is necessary to promote their widest use in feed, and food. Research is also needed to increase the utilization of rice through improving milling methods, improving quality and lowering costs of processing rice for market.

Research is needed on the composition and processing of forage crops to enable optimum choice to be made of forages as replacement crops and to improve efficiency of livestock production. Each variety of forage is a complex mixture of hundreds of chemical substances, most of them still unidentified, and of unknown effects on the health and growth of animals consuming them. For example, recent studies with certain forages have isolated saponins and demonstrated their toxicity and bloat-producing symptoms in ruminants and growth inhibitors in chicks. Research is needed not only to develop such essential infor-

mation for forages, but also to determine methods of stabilizing or preserving the nutritive value of forages harvested as silage and as hay.

Plan of Work: Research would be expanded on the development of new and expanded uses for grains and forages as follows:

Wheat

Gluten and starch, either isolated or as they occur in flour, are the major constituents of wheat that offer the most promise for increased non-food use in industry. Research would be expanded on

- (a) The development of a cheap and efficient process for the production of undevitalized gluten for conversion into industrial products and use in the baking industry.
- (b) The chemical modification and conversion of wheat gluten to produce materials having new chemical and technical uses. Wheat gluten alone among all proteins of vegetable origin has the qualities of elasticity, extensibility, and strength in high degree.
- (c) Chemical modification of wheat flour to alter its properties and its potentialities for such markets as adhesives, coating, papermaking chemicals, textile sizes, and the like.
- (d) Studies to increase the use of wheat starch in paper products. Because of the rapidly growing demand for paper and paper products such research has great possibilities.
- (e) Studies on the chemical composition of the non-flour fraction of wheat, known to be a valuable source of nutritionally important factors, to provide a basis for increased utilization of wheat as feed through identification of additional constituents of nutritional significance.
- (f) Composition studies of Western soft wheat flours to determine those properties most essential for production of specialty baking items such as cakes, sweet rolls, and cookies.
- (g) Frozen preservation of sweet soft wheat doughs and cake batters to make tasty and easily prepared wheat foods more readily available.

Small Grains

- (a) Sorghum grains contain various unidentified pigments of importance in industrial utilization and use as a feed. They are known to be sometimes deleterious and sometimes beneficial. Research would be conducted on these pigments to provide a basis for improved utilization of sorghum grain by enabling selection of varieties with desired pigmentation or absence thereof.
- (b) Unidentified factors in oats have been demonstrated to have beneficial and harmful effects in the use of oats for feed, and others are important in the industrial utilization of oat products. The chemical composition of oats and barley would be studied to expand their use as feed and food, or for industrial applications.

(c) The physical properties and chemical composition of milled rice would be studied to improve the quality of the product and to tailor-make the properties to suit consumer preferences in various world markets, thereby increasing demand for the commodity.

Grass and Forage

(a) To expand the utilization of grasses and forage, basic research is needed on the beneficial and deleterious constituents of forages and the changes that occur in the nutrients of harvested forages.

(b) Amino acids of the proteins of forages are of primary importance in the feeding of livestock. Proteins in green grass are altered when the grass is harvested and dried. Research on these changes is needed to select methods which will provide for maximum preservation of the feeding value of forage crops.

(c) To reduce the loss of nutrients in harvested forages due to respiration, studies would be conducted on the effects of environment and chemical inhibitors on such losses.

(d) Recent investigations reveal that some legumes contain a compound that is implicated in ruminant bloat and suppresses growth rates in poultry. Legumes of known history would be studied chemically and pharmacologically to determine if the bloat and growth inhibition factor can be controlled.

(11) Increase of \$400,000 under the utilization research activity, "Cotton and other fibers," for investigations to increase new markets for cotton, wool, and mohair.

Need for Increase: In order to improve the market for cotton, domestic wool and mohair every possible improvement and economy in processing needs to be explored. The competitive position of these fibers must be greatly improved to compete with increasing consumption of synthetic and imported fibers. The doubled consumption of synthetic fibers in the past 10 years is largely due to extensive commercial research designed to embody qualities desired in United States markets. This increased consumption has made serious inroads on traditional agricultural markets. The chemical industry is spending more than \$50 million yearly for research on synthetic fibers.

Cotton continued to lose ground in its share of the total fiber market in 1954 and tied with 1950 as the lowest percentage for cotton since Department records were started in 1913. The per capita consumption of cotton in 1954 dropped to 25.4 pounds which is 2.5 pounds less than in 1953, and 3.5 pounds less than the 1949-1953 average.

The per capita consumption of wool in 1954 was only 2.3 pounds. This was 32 percent less than the 1949-1953 average and 43 percent less than the 1944-1953 average. Sheep and goats are raised on approximately a half million farms and ranches in the United States. National policy calls for substantial increases in domestic production which make it imperative to exploit fully the national potentialities of this important farm fiber.

Specific needs in cotton research at this time are as follows:

- (a) Development of automatic equipment for opening and blending cotton from different bales to obtain a uniform product to compensate for the wide variation in properties of cotton received at textile mills.
- (b) Development of fundamental relationships between yarn and fabric properties. Such information will make it possible to select yarns of proper characteristics for the production of fabrics to meet specific end uses.
- (c) Determination of the effect of short fibers ($1/4$ inch and shorter) in raw cotton on processing efficiency and the quality of the resultant textile products.
- (d) Development of cotton fabrics with permanent crease retention in laundering or dry cleaning after garments are manufactured. Synthetic fibers have good crease retaining properties but those for untreated cotton are very low. This property is desired in important uses, such as men's trousers and women's pleated skirts.
- (e) Treatment of cotton with chemical compounds to improve such desirable qualities as wrinkle resistance, flame resistance, tear strength, water repellency, resistance to deterioration by light and rotting, and resistance to soiling.
- (f) Design and development of cotton fabrics having improved tear resistance.
- (g) Determination of the stress-strain behavior of cotton in terms of internal structural elements. This basic information is needed to change the structure of the cotton fiber so as to obtain improved drape, crease resistance, elastic recovery, strength, and other derived properties. Modification of structure of cotton can be obtained partly by breeding if basic information on structure for special processing requirements is known.

Specific needs in wool and mohair research are as follows:

- (a) Development of improved methods for evaluating the quality of wool fabrics. The demand for increased efficiency of operations in manufacture and high quality finished materials requires a basis for evaluating uniformity and quality of raw materials.
- (b) Improvement of the method for bleaching off-color wools. Domestic wools are frequently off-color and require bleaching which is costly and harmful to fiber quality. This is one important reason why domestic mills generally prefer whiter Australian wools and are willing to pay premium prices for them.

- (c) Pilot-scale engineering studies to evaluate practical application of recent laboratory chemical treatments which show much promise in greatly improving the resistance of wool to shrinkage in laundering. Shrinkage is one of the most serious disadvantages of wool in competition with synthetic fibers.

Plan of work: The proposed increase would be used in chemical and engineering studies with fibers, fabrics, and the relation of fibers to fabrics; development of treatments for fibers to impart desired commercial characteristics; and for the development of equipment which would aid in processing of fibers and fabrics. Where advantageous to the government, some of the work would be done under research contracts.

(12) Increase of \$810,000 under the utilization research activity, "Fruits and vegetables" to construct a laboratory in Winter Haven, Florida for research on citrus and other fruits and vegetables.

Problem and Need: The present laboratory in Winter Haven, Florida for research on the utilization of citrus and other fruits and vegetables is of frame construction, originally erected in 1931 and enlarged somewhat in 1939-40. The working space is badly overcrowded and the construction and arrangement of the facility is not suited to the laboratory and pilot plant operations now needed for research on the problems of the fruit and vegetable industry.

When the laboratory was established, it was not anticipated that there would be the tremendous expansion which has occurred in the citrus fruit and vegetable industry, or the accompanying need for additional research. Florida citrus production has increased more than 400 percent since then, and whereas in 1931 less than 10 percent of the crop was processed, now over 60 percent goes into frozen concentrate, into canned juice and segments, and into other processed forms.

The laboratory at Winter Haven has contributed importantly to many of the problems of the fruit industry especially the citrus fruit industry, but it is no longer adequate for the work that needs to be done. With the greatly expanded production of vegetable crops and sub-tropical fruits, research on processing these crops also is badly needed. In many instances, the laboratory does not have the space or facilities to work on these problems.

Citrus, other sub-tropical fruits, and vegetables produced in the South are generally grown for the fresh markets, but frequently it is necessary to process substantial portions in order to achieve the largest possible market outlets and to avoid burdensome surpluses. The discovery of new and the improvement of current processing methods is essential to meeting the problem. The use of heat, cold, and other treatments in the processing of fruits and vegetables may greatly affect flavor, quality and life of the product. Research, both fundamental and applied, is needed to determine the most economical and effective processing methods.

The Citrus Fruit Advisory Committee and many other industry groups have urged the construction of new laboratory facilities.

Plan: The City of Winter Haven, Florida has agreed to provide without cost to the government a suitable site for the proposed new laboratory in consideration of the return to the city of the property now used for the citrus products laboratory. That property was originally donated by the City to the Government in 1931.

It is planned to construct a one-story and basement laboratory building with a pilot plant. The facilities would include 9 chemistry laboratory rooms, a bacteriology laboratory and plating room, a low-humidity room, photographic room, oven room, product evaluation room, and several constant-temperature rooms including some very low temperature rooms. The building would be approximately 165 x 115 feet.

The annual additional cost of research which would be conducted in the new laboratory is estimated at \$75,000.

Estimate of Cost: The cost of constructing the laboratory is estimated as follows:

Architects and engineers fees	\$ 50,000
Laboratory building and pilot plant . . .	
including related equipment	720,000
Garage, solvent storage building	
grounds improvement, etc.	40,000
	<u>810,000</u>

(13) Increase of \$600,000 under the utilization research activity, "Sugar and special plants" composed of:

(a) Increase of \$500,000 for investigations on new crops valuable for food, feed, drug or industrial uses.

Need for Increase: The discovery and development of new crops which would be valuable for food, feed, drug, or industrial uses could greatly improve the agricultural situation. For example, the introduction and development of soybeans has resulted in a crop produced in 1955 on over 18 million acres with a farm value of approximately \$780 million.

Systematic screening of large numbers of selected plants, and in many cases of their seeds, is needed to provide the chemical composition data essential to the determination of their potential value as foods, feeds, and industrial raw materials. At the present time, such information has been obtained for only a very few plants.

Plants known to have high potential value by virtue of their chemical composition will have to be grown in the quantities needed for development of processing methods and for determination of their usefulness. This involves close cooperation with crop and agricultural engineering research. When it has been found that a potentially useful crop can be produced commercially, it may be necessary to conduct laboratory and pilot plant research to develop processes necessary to utilize the product and make it available in the condition needed by the consumer.

Plan of Work: Initially, a substantial portion of the increase would be used in fundamental research on the screening and testing for chemical composition of a wide variety of selected plants with emphasis on (a) forage plants of particular importance as feedstuffs for our expanding animal agriculture and for soil conserving and building attributes, and (b) those plants having potential value for industrial uses that would be noncompetitive with present domestic crops. Composition studies would include classes of products such as proteins, fibers, gums, oils, and highly valuable minor constituents such as vitamins and growth factors. The source material for screening will consist of newly developed strains of domestic plants, wild native plants, and foreign introductions as now contained and being made available in the four Federal plant introduction gardens and the five primary introduction stations in the Federal-State cooperative program. Close cooperation will be maintained with the regional committees of the State Experiment Stations on "New Plants for Industrial and Other Uses."

Where new crops have reached agronomic stages that developmental research is warranted, utilization research of an applied and developmental nature would be conducted to provide information necessary to develop processing methods and evaluate the products for industrial uses. In general, research would be initiated as follows:

- (1) To study the pulping of timber bamboo and the evaluation of the pulp as an economic source of newsprint which is in short supply, and other pulp products.
- (2) To develop improved processing methods for producing safflower oil and to investigate methods for converting this oil into industrial chemicals which are not competitive with products now produced from soybean and linseed oils.
- (3) To study methods for processing the new "high amylose corn" to produce a high-amylose type of starch, the uses of which would be in the industrial field for the production of fibers and films which would be noncompetitive with current uses of starches from ordinary corn or from waxy corn.
- (4) To develop new uses for castor oil and to investigate methods for inactivating the toxin and allergen in castor pomace (meal) to make it useful for feed and fertilizer, also to improve castor bean processing. Castor oil is unique among vegetable oils, and in most respects is not competitive with them. It has good potentialities for special industrial uses.

(5) To evaluate Jojoba and other oil and wax-bearing plants. Jojoba seed (*Simmondsia chinensis*) is known to contain a natural liquid wax of premium quality.

(6) To develop low-cost methods for preserving and processing fruits, nuts, and vegetables that appear to have promise in domestic markets, but which are not now grown in this country in substantial commercial quantities, usually because of the high labor cost in processing them. Among the commodities which most merit investigation are mangoes, lichee fruit, macademia nuts, Chinese gooseberries, service berries, cherimoyas, bamboo shoots, edible pod peas, water chestnuts, Italian broad beans, mung beans (bean sprouts), and pigeon peas. The potentialities are exemplified by broccoli. In 1930, there was almost no production of this crop, but due primarily to the development of new methods of processing (freezing), production increased to 44,000 acres by 1953.

(b) Increase of \$100,000 to expand uses of tobacco and sugar.

Tobacco

It is urgent to the well-being of the tobacco industry that more research be done on the composition of tobacco and tobacco smoke, and on the relationship between chemical constituents and the quality of tobacco. Basic work on composition can be expected to contribute to improved quality of tobacco products, development of improved processing methods, and better utilization of tobacco wastes.

Recent publicity has been given to the possible detrimental effects of cigarette smoking on health. An alarming rise in the frequency of lung cancer is variously attributed to pollution of the air by waste industrial gases and to excessive cigarette smoking. The cause is actually unknown and the evidence controversial and incomplete. However, as a result of this publicity the tobacco industry has become deeply concerned with the need for more detailed information on the composition of tobacco and tobacco smoke.

At present about 2 billion pounds of tobacco are produced in the United States each year, having a farm value of over 1 billion dollars and a return of over 2 billion dollars in revenue to Federal, State, and local governments. From the standpoint of cash receipts, tobacco ranked fourth among field crops in the United States in 1953.

The various types of tobacco used in the manufacture of tobacco products arise from differences in variety, character of the soil and climate, fertilizers used, methods of harvesting, and methods of curing. Each type has special characteristics which determine its end use. These characteristics include color, flavor, texture, aroma, and burning qualities; and they depend on chemical composition and changes in composition from the time the green leaf is harvested, through the curing, aging, fermentation, and compounding of the final tobacco product. Present knowledge of the chemical composition of tobacco at all stages of handling and processing, and the chemical composition of the smoke which is the final product consumed in most tobacco products, is very meagre.

Sugar

Currently the most important problem both in sugarcane and sugar beets is the failure to recover all the good sugar that is present in the cane and the beet. In Louisiana alone it is estimated that an additional $3\frac{1}{2}$ million dollars per year would be realized if the recovery of raw sugar could be raised from 75 to 80 percent of the amount available in the sugarcane. Studies in the beet industry have indicated that there is an estimated loss of at least half a million dollars a year because of chemical degradation during processing. Improvement in processing which would increase recovery of good sugar would greatly benefit both producers and processors.

Improved processing methods are needed in the sugarcane industry as well as new sugarcane varieties with better milling and processing qualities. Speeding up the present time-consuming methods of evaluating processing qualities would improve over-all economy of the sugarcane industry through establishing the relationship between varieties and their processing qualities. Beet technology and purification offer a particularly fertile field for investigations and substantial savings.

Plan of work:

Tobacco. Chemical investigations would be made of the resins and polyphenols of tobacco. Improved methods of separating and identifying alkaloids of tobacco and their transformation products would also be developed.

Sugar. Investigations would be made of the non-sugar carbohydrate constituents of sugarcane not previously isolated and identified. Juices obtained in pilot plant experiments would be used to relate concentrations of carbohydrate constituents to their known behavior in sugar manufacturing operations and to the recovery of sugar.

Reaction of beet constituents with lime under conditions ordinarily encountered in purification would be investigated. Comparison would be made of various preliming methods in an attempt to find one which reduces the amount of lime required but which can be carried out automatically. New purification methods would also be developed to improve the efficiency of that operation.

(14) Increase of \$553,000 under the utilization research activity, "Poultry, dairy, and animal products," for research to increase the farmers' market for poultry, dairy products, meat, and animal hides.

Need for Increase: Increased markets for poultry, dairy, and animal products would benefit growers, processors, and consumers. However, increased markets are dependent to a large extent on the availability of high quality, lower cost, and more desirable items from these highly nutritious foods. To accomplish this objective, research is needed to improve quality without increasing costs, improve the convenience of product form, find means of reducing processing costs, and develop new product forms to meet special market demands.

Specific problems and plans of work:

(a) Poultry and poultry products:

- (1) A large market exists for eggs prepared in dry form, as for mixes and use by the bakery trade. Marked improvements in the flavor and color stability of egg solids has been made but the poor reconstitution ability of egg solids is a factor that is limiting their increased utilization. Another factor is the loss of foaming or leavening properties required in making sponge cakes. Research would be undertaken to develop an "instant" reconstituting type of egg solid. Studies would also be made to determine means of preventing loss of foaming and leavening properties during drying.
- (2) Improvement in feather removal in dressing poultry is needed. This process costs \$50 million annually. Present methods are unsatisfactory because they compromise between economy of operation and quality of product. Reduced quality is caused by skin damage and an increased tendency toward loss of moisture and toughness in some birds. Development of optimum methods of feather removal both quality wise and cost-wise would be sought.
- (3) Methods of increasing consumer acceptance of turkeys, chickens, ducks and geese through convenient marketing forms, such as smoked or cured items and precooked frozen meat would be developed.

(b) Dairy products:

- (1) To improve the milk surplus situation and to expand use of processed products in domestic and foreign markets, work would be conducted on the development of methods of processing products possessing the flavor and consistency of fresh milk.
- (2) To aid the cheese industry, research would be conducted on the development of economical methods for the conversion of cheese whey to byproducts of greater value, and cheaper methods of treatment if byproduct use is not possible.
- (3) The development of new outlets for milk and increased stability of product requires expanded research on the basic chemical composition of milk. Research on such studies would be undertaken, including studies of proteins, their composition and reactions with other constituents, and similar studies of the role of milk fat in milk products.

(c) Meat:

Over 26 billion pounds of meat are produced annually in the United States. Meat production accounts for about 30 percent of farm income, and is thus our Nation's most valuable agricultural product. About half of the total meat production is beef. Of this at least 5 billion pounds is beef of lower grades for which there is a relatively limited market at a price not favorable to the farmer. Such beef is generally less tender than that of higher grade. Improvement in tenderness would increase its acceptability and thus the demand for low-grade beef.

To improve the market demand for meat, it is proposed that studies be carried out along the following lines:

1. Increase the utilization of the lower grades of meat through studies on the relationship of the amount, distribution and occurrence of protein components and other chemical constituents to such quality factors as tenderness, juiciness and flavor.
2. Improve the quality of low-grade meats through development of objective methods of determining the tenderness of meat that can be applied rapidly to the assay of tenderness in wholesale cuts or carcasses.
3. Studies of the physical and chemical characteristics of meat structure to obtain basic information needed in developing improved methods for processing meat.
4. Improving the quality of meat through studies of low-temperature tolerant bacteria, and their relation to the keeping quality of fresh and cured meat.
5. Development of improved methods of curing meat through studies of salt-tolerant microorganisms and their relation to cured meat quality.
6. Improving the quality of meat and meat products through studies on the recovery and identification of the substances responsible for the flavor and aroma of meat.

(d) Hides:

The rise in beef consumption to 26 million head per year has increased the production of hides to about 5 million in excess of our domestic needs. These surplus hides are sold on the world market and exported but their existence has depressed the domestic price from an average of 24 cents per lb. during the period 1947 through 1951 to 10-13 cents per lb. in 1955. This represents an annual loss in value of almost 200 million dollars which is reflected in the prices which otherwise would be received by the livestock raisers. Synthetic leather substitutes have also been making serious inroads in the leather market.

The proposed increase would be used to initiate the following lines of work:

1. Development of economic processes for producing leather with improved resistance to water, wear and acid deterioration;
2. Exploratory and pioneering studies on the determination of hide and leather quality by nondestructive testing for tightness of structure, quantity of leather-making substance and hidden deterioration in raw or processed hides;
3. Fundamental studies of the physical and chemical properties of hide proteins and of the mechanism of interaction of hide substance with chemicals and tanning agents;

4. Evaluate mechanical, physical and chemical aids for controlling the rate of unhairing of hides by enzymes in order to develop a more rapid and economic process that can be integrated into packing house operations;
5. Studies on the chemical modification of hide glues to improve adhesive strength, gelling time, tackiness, and resistance to water.

The increase of \$1,519,300 under the subappropriation item, "Plant and animal disease and pest control" for 1957 consists of:

(15) Increase of \$500,000 under the activity, "Plant pest control" for the contingency fund for emergency outbreaks of insects and plant diseases.

Need for Increase: The proposed increase would provide a total of \$1,500,000 for this contingency fund. For fiscal year 1956 it is anticipated that a supplemental appropriation of \$500,000 will be required, increasing the contingency fund for that year to \$1,500,000. Based upon approval of the supplemental for 1956, the budget request of \$1,500,000 for 1957 actually involves no increase in appropriation.

Legislative Authorization: The need for an emergency fund for assistance to States in combatting emergency outbreaks of crop pests was first recognized by the 75th Congress which passed Public Resolution No. 20, approved April 6, 1937, authorizing \$2,000,000 to be appropriated for the control of incipient or emergency outbreaks of insect pests or plant diseases, including grasshoppers, Mormon crickets, and chinch bugs. On May 9, 1938, the joint resolution was amended, in part, to authorize annual appropriations for this purpose. In the past ten years, appropriations for control of emergency outbreaks of insects have varied from \$2,700,000 available in 1946 to \$600,000 in 1954. The amount appropriated for fiscal year 1956 is \$1,000,000, but a supplemental appropriation of \$500,000 is contemplated.

Purpose of Fund: The contingency fund is available only upon approval by the Secretary and the Bureau of the Budget, for control operations which cannot be financed from the funds provided for specific control programs. The emergency type programs financed from these funds are (1) an incipient infestation of a pest new to this country; (2) an incipient infestation of a pest discovered in an area remote from that where a control program is currently under way; (3) an unforeseen outbreak of major significance of a pest for which no control program had been provided; and (4) an unexpected outbreak of major significance of a pest against which a control program is in operation but which threatens severe losses or would result in increased expenditures if action were delayed.

Difficulty of estimating needs accurately: Control programs financed from these funds are ordinarily highly seasonal and cannot be planned very far in advance. Facts based on field observations must be assembled, appraised by cooperating agencies, and a determination made on the division of responsibilities and costs before a program can be recommended for approval of the Secretary and the Bureau of the Budget. The amount requested in each annual budget is the best estimate which can be made at the time of submission. It may prove to be more or less than the amount that is actually required. A table showing use of the contingency fund for the fiscal years 1951 through 1956 (to 12/31/55) follows:

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE

Releases from the Contingency Fund, for Control of
Emergency Outbreaks of Insects and Plant Diseases
Fiscal Years 1951 through 1956 (to 12/31/55)

Project	1951	1952	1953	1954	1955	1956 to 12/31/55
Contingency Fund:						
Annual appropriation acts	\$1,250,000	\$1,000,000	\$1,000,000	\$600,000	\$400,000	\$1,000,000
Supplemental appropriation acts	- -	- -	- -	- -	650,000	- -
Total appropriations for Contingency Fund	1,250,000	1,000,000	1,000,000	600,000	1,050,000	1,000,000
Releases for Control of Emergency Outbreaks of Insects:						
Grasshoppers and Mormon crickets	151,455	144,000	438,700	528,940	284,300	154,700
Burrowing nematode	- -	- -	- -	- -	35,000	a/ 78,000
European chafer	- -	- -	- -	- -	50,000	83,000
Khapra beetle	- -	- -	- -	- -	156,000	a/ 266,000
Mexican fruitfly	- -	- -	- -	- -	125,000	a/ 67,000
Total releases	151,455	144,000	438,700	528,940	650,300	648,700
Balance in Contingency Fund	1,098,545	b/ 856,000	c/ 561,300	71,060	d/ 399,700	351,300

a/ Covers control operations for six months only.

b/ Includes \$37,800 not required for emergency insect control activities which was transferred to the item for control of vesicular exanthema to meet emergency needs.

c/ Includes \$500,000 not required for emergency insect control activities which was transferred to the item for control of vesicular exanthema to meet emergency needs.

d/ Due to late emergence of grasshoppers in spring of 1955, control operations were not completed by the close of the fiscal year. The portion of the work which carried over, and done in July, was charged to 1956 funds, thus leaving an unused balance in the 1955 appropriation. This balance was transferred, after the close of the fiscal year, to other appropriations to meet retroactive pay act costs pursuant to Public Law 123, 84th Congress. This had no effect on the level of 1955 programs, inasmuch as the Pay Act itself was approved on June 28, 1955, and all of the actions to implement it were taken following the close of the fiscal year 1955.

Current status: For several years prior to 1955, allocations had been made principally for grasshopper and Mormon cricket control. However, demands on the contingency fund have increased since the discovery of the following infestations: (1) khapra beetle, a serious introduced pest of stored grain and seeds first discovered in California in November 1953; (2) Mexican fruit fly, discovered in northwest Mexico where it threatens fruit production in California and Arizona; (3) burrowing nematode, determined in 1953 to be the primary cause of the "spreading decline" of citrus; (4) soybean nematode found in North Carolina in August 1954 and a threat to soybean production in the United States; and (5) European chafer, until recently confined to a limited area in New York, but now found in Connecticut, and West Virginia as well as in several areas in New York. Each of these infestations involves an introduced pest, as yet confined to a relatively limited area in this country. Eradication programs should be conducted promptly to avoid the more costly programs necessary after the pests have become widespread. The status of each program is as follows:

Grasshopper and Mormon cricket control in the Western States -- Recent fall surveys indicate that some 20 million acres of public and private rangeland included within infested areas in 16 western states will support destructive populations during the 1956 crop year. This is an increase of approximately 14 million acres over the 1955 outlook. It appears that the peak of the outbreak cycle in the Southwest, which is of more than one year's duration, may not yet have been reached.

Khapra beetle -- Federal, state, and industry expenditures will be particularly heavy during calendar year 1956. The program provides for catching up on the fumigation of establishments that were found infested before satisfactory fumigation procedures were worked out. Once this has been accomplished, fumigation costs are expected to decline rapidly.

Mexican fruit fly -- Developments indicate that expenditures for control will continue for the next six to twelve months at about the present level. This assumes that the effort to keep infestation out of California and Arizona will prove successful.

European chafer -- The enforcement of the Federal quarantine and cooperation with states in suppressing infestations are expected to require continuing expenditures at about the present level.

Burrowing nematode -- To carry out a survey to establish the presence or absence of the burrowing nematode in Florida and in other citrus-producing areas is expected to require expenditures at about the present level during the remainder of the current fiscal year and in 1957.

Soybean nematode -- The picture is not yet clear as to what may be necessary to contain or eradicate this nematode. The results of surveys now under way, however, will provide a basis for developing a satisfactory program.

Other pests -- In addition to these known infestations, there is always the possibility of the discovery of some new pest which would require emergency control measures.

Cooperation: With each program, there has been substantial participation on the part of the States, local agencies, and the industries involved.

Financial requirements: The following table summarizes the probable requirements for these programs for the remainder of the current fiscal year and for the fiscal year 1957:

Pest	Fiscal Year 1956 a/				Estimated Needs 1957
	Balance Available and Proposed: Released : 12/31/55	1956 Supplemental:	Total		
Grasshopper					
1955 crop year ..	b/\$154,700:	- -	\$154,700:		
1956 crop year ..	- -	\$400,000:	400,000:		
Total	154,700:	400,000:	554,700:	\$550,000	
Khapra beetle	266,000:	266,000:	532,000:	535,000	
Mexican fruit fly ..	67,000:	67,000:	134,000:	135,000	
European chafer ...	83,000:	- -	83,000:	80,000	
Burrowing nematode	78,000:	72,000:	150,000:	150,000	
Soybean nematode,					
etc.	- -	46,300:	46,300:	50,000	
	648,700:	851,300:	1,500,000:	1,500,000	

a/ The current 1956 appropriation includes \$1,000,000 for the contingency fund.

b/ Due to the late grasshopper control season in the northern areas in the 1955 crop year, it was necessary to release \$154,700 in July 1955, for control work. Normally, these costs would have been incurred as a part of the 1955 fiscal year program.

(16) Increase of \$966,300 under the activity, "Plant quarantine" composed of:

(a) Increase of \$856,000 to be made available to the Bureau of Customs to enable it to restore procedures for checking baggage to an adequate level to allow detection of prohibited or restricted agricultural materials in passenger baggage.

Problem and Need: Experience in the enforcement of agricultural quarantines has shown that passengers' baggage is one of the most likely means of entry for foreign agricultural pests. In former years the Bureau of Customs made a practice of examining essentially all incoming baggage and the plant and animal quarantine services, because of their relatively small staffs and to avoid duplication of effort, relied heavily on the cooperation of the Bureau of Customs to prevent the introduction of new pests and diseases of plants and animals through the medium of passengers' baggage. Whenever Bureau of Customs inspectors find plant, animal or other material in passengers' baggage of agricultural quarantine interest, they turn such material over to Department of Agriculture quarantine inspectors for examination and disposition.

In April 1953 the Bureau of Customs advised that in order to give the best possible service to the public under existing traffic conditions with its staff, it appeared necessary to effect a considerable relaxation in the degree of examination of passengers' baggage. Since that time, the resulting threat to United States agriculture from relaxing the inspection of baggage is becoming increasingly evident. A study made at New York last year indicated that less than half of the contraband plant material arriving at that port in passengers' baggage is being detected by current inspection methods. By complete baggage inspection during the study a total of 440 interceptions of plant pests were made as compared with 69 interceptions made through sample inspection of the baggage of approximately the same number of passengers arriving on the same vessels the preceding year. The test revealed similar results with respect to meat and meat products.

The following measures have been taken to provide the best plant and animal quarantine protection possible under the present circumstances:

1. Considerable study has been given to devising better methods of informing the public of quarantine restrictions as a means of obtaining more effective compliance. Information on this subject is contained in a leaflet "Customs Hints" which is widely distributed to travelers; large warning signs have been placed at Mexican border ports; passengers on vessels from Hawaii are required to sign baggage declarations listing any plant material in their possession; agricultural attaches are briefed on agricultural quarantine regulations prior to assignment at foreign posts in order that they may inform passengers planning to visit this country of the restrictions.

These measures have undoubtedly reduced the number of violations. A further study is now being given to methods for obtaining still better distribution of agricultural quarantine information. However, the continued finding of plant and animal material in the baggage of passengers who have been made aware of the regulations has repeatedly demonstrated that efforts to educate the public do not make an effective substitute for actual inspection.

2. Emphasis has been placed on the inspection of baggage of those classes of passengers which are most likely to bring in contraband material and from those foreign areas which, experience has shown, is most likely to contain hazardous plant and animal material. However, the frequent finding of contraband material in baggage of all classes of passengers and from all foreign sources has demonstrated that the only safe procedure is complete baggage examination.
3. Consideration has also been given to the value of penalties in reducing violations of agricultural quarantine regulations. The Plant Quarantine Act provides up to \$500 fine and a year's prison term for such violations. In nearly every instance where contraband agricultural material is found in baggage, however, only small quantities and small values are involved. There is great difficulty in obtaining a conviction for the possession of a fruit or a piece of meat worth only a few cents even though they could carry insects or diseases that could cost the country millions of dollars.

The relaxation of baggage inspection procedures by the Bureau of Customs has created a situation whereby the threat of introduction of new and destructive foreign pests and diseases is greatly increased. The potential losses to American agriculture from such introductions and the cost of controlling or eradicating those that might become established could well exceed by many times the cost of restoring adequate baggage inspection.

Although the Treasury Department has indicated that current baggage inspection procedures are considered adequate for the purposes of enforcing Customs laws, that Department is cognizant of Agriculture's interest in more adequate baggage inspection for agricultural quarantine purposes. The Secretary of the Treasury on March 1, 1955 wrote the Secretary of Agriculture in part as follows:

"If you should conclude that the enforcement measures of Customs are not adequate for your purposes in that additional measures should be taken I believe that the Department of Agriculture should undertake to provide the funds necessary to carry out such additional measures. Our people will be happy to undertake such additional measures on a reimbursable basis as you may consider to be necessary."

Plan of Work: On the basis of information obtained from Customs it is estimated that the sum of \$856,000 would permit Customs to resume previously established standards of baggage inspection. Customs considers it essential that the present practice of expediting the clearance of incoming passengers be continued and that any change in inspection procedures should provide for equally prompt clearance. That agency has indicated that the proposed increase would permit them to employ sufficient inspectors to clear incoming passengers as promptly as is being done at the present time. Additional Customs inspectors would be employed and stationed at maritime ports and airports where the need is greatest. The proposed increase would be used to establish an advance working fund for the Bureau of Customs for such purpose.

(b) Increase of \$110,300 to strengthen inspection service at ports of entry.

Problem and Need: The problem of protecting American agriculture from foreign plant pests is increasing daily. The threat of entry and spread of such pests is directly related to the volume of foreign travel and commerce. The continued growth of world travel and trade, with an accompanying increase in the risk of introducing foreign pests and diseases, and without comparable increase in the plant quarantine inspection force, seriously weakens the protection which can be given.

The Bureau of Customs estimates the number of persons entering the country, as follows:

<u>1947</u>	<u>1954</u>	<u>Estimated 1955</u>
78,000,000	114,074,000	120,000,000

The number has increased from 6 to 10 percent each year since the war.

The recent discovery of the khapra beetle in the Southwest; the Mexican fruitfly in Baja California, Mexico; the Mediterranean fruitfly in Central America; and the continued arrival of the golden nematode in an increasing number of products and reports of its occurrence from additional countries all point up the need for increased vigilance against the entry and spread of these and other destructive plant pests. Strengthening of the inspection service at ports of entry is greatly needed to cope with this increasing workload in all major phases of the plant quarantine program.

The following tabulation shows the increase in workload at the United States ports of entry:

	F.Y. 1954	F.Y. 1955	F.Y. 1956 (Estimated)	Percent Increase 1956 over 1954 1955	
Inspection:					
Airplanes	77,029	89,205	91,000a/	18	2
Vessels	52,311	48,205	53,000	1	10
In coopera- tion with Customs:					
Baggage, air- borne, pieces of	2,275,714	4,592,254	6,000,000	164	31
Baggage with auto and rail passengers from Mexico .	3,664,803	4,107,413	4,500,000	23	10
Vehicles from Mexico	14,367,598	15,240,649	16,000,000	11	5

a/ Larger planes are constantly replacing smaller aircraft thus increasing the inspection time required per plane.

A comparable increase in work-load is anticipated in the fiscal year 1957.

It is becoming increasingly difficult to provide plant quarantine coverage with respect to military aircraft arriving from foreign areas. Long range strategic flights often arrive at airports not regularly staffed with plant quarantine inspectors. Rotation of 4,000 troops from Japan by air was recently successfully accomplished and the military has indicated that we may expect this practice to be continued and expanded. Shifts in operating bases by the Military Air Transport Service recently necessitated corresponding shifts in personnel and increases in inspection staffs to safeguard incoming flights. All indications are that the problem of preventing the entry and spread of foreign plant pests on military aircraft will become more acute as air operations to foreign bases continue to expand.

The restoration by Bureau of Customs of the inspection of all passengers' baggage would greatly increase the likelihood of preventing all foreign diseases and pests from gaining entry into this country, but it would not alleviate the need for more plant quarantine inspectors. The examination and disposition of materials found in passengers' baggage of agricultural quarantine interest is not the responsibility of the Customs inspectors but of the Department's quarantine inspectors. Their workload, therefore, will be increasing not only because of the greater volume of foreign travel and commerce and the greater number of ports involved, but also to some extent because of the increased number of interceptions by Customs inspectors which would occur under the proposed increase above.

The \$308,700 provided in the 1956 appropriation act, is being used to employ additional inspectors at the ports most in need of strengthening, and where there is the greatest probability of plant material arriving which might harbor extremely dangerous plant pests.

Plan of Work: The proposed increase for 1957 of approximately 4 percent would be used to strengthen the inspection work to meet the increasing work-load. It is proposed to add 19 plant quarantine inspectors. These will be stationed where the need is greatest at ports around the periphery of the continental United States, such as New York, N. Y., Miami, Fla., New Orleans, La., Laredo, Texas, San Ysidro, California, and in Hawaii and Puerto Rico. This would enable the staff at such locations to better meet the demands for inspectors to cover international movements of troops at military air fields.

(17) Increase of \$53,000 under the activity, "Animal Quarantine" to strengthen animal inspection and quarantine work along the Mexican border.

Problem and Need: Areas of Mexico adjacent to the United States border are known to be extensively infested with cattle fever ticks. Such diseases as scabies, dourine, and glanders are also to be found in Mexican livestock and create a hazard to the health of our domestic livestock. The Mexican border extends for approximately 2,000 miles, and except for the inspection of legal importations at designated ports of entry, there is little protection against the deliberate or accidental introduction of communicable livestock diseases. Many areas along the border between designated ports offer easy entry into this country of stray and smuggled animals and animal products. Thus, there is a continuous danger of these diseases entering this country and spreading.

The present small force of inspectors must cover 14 designated ports of entry through which importations are regularly made and also provide service occasionally at 3 or 4 other points. In order to comply with laws and regulations governing importations, their duties include:

For animals and poultry:

1. Procurement of current information on livestock and poultry diseases in Mexico.
2. Investigations of the origin of each shipment.
3. Examination of documents accompanying each shipment.
4. Individual inspections of all animals and poultry.
5. Quarantine, testing and dipping livestock offered for importation as applicable in each case.
6. Supervision over the handling of animals and poultry found to be eligible for importation.

For livestock and poultry products (meats, hides, bone meal, glands, etc.) and hay and straw:

1. Inspection and examination of documents accompanying importations to determine whether they may be permitted entry with or without restriction for further processing or refused entry.

2. Supervising forwarding of restricted products under Government seal for further processing at establishments approved by the Department.

Since Mexico was declared free of foot-and-mouth disease on December 31, 1954, there have been a large number of cattle imported from that country. These animals require tests, certification, inspections or dippings for tuberculosis, brucellosis, scabies, cattle fever ticks, or other communicable diseases. The importation of equine stock has increased greatly, since 1953, particularly burros to be used as pets for children. These animals require tests for dourine, which does not exist in this country, and for glanders which is transmissible to man.

Imports from Mexico in fiscal years 1954 and 1955 were as follows:

	<u>F. Y. 1954</u>	<u>F. Y. 1955</u>
<u>Imports:</u>		
Cattle	<u>1/</u> - -	<u>1/</u> 218,467
Equine stock	23,000	18,587
Animal by-products		
Restricted	715,652 lbs.	1,074,891 lbs.
Unrestricted	2,624,156 lbs.	3,992,283 lbs.

1/ Because of the existence of foot-and-mouth disease in Mexico, no cattle were imported in fiscal year 1954 or the first 6 months of fiscal year 1955.

The increasing movement of livestock, together with the hazards created by the large unprotected areas along the border has created a situation with which the present limited inspection force cannot adequately cope. There is urgent need for strengthening the work. The cost of more adequate protection would be small in comparison with the cost of controlling or eradicating an extensive outbreak of a disease introduced across the border.

Plan of Work: It is proposed to increase the inspection force by 8 lay-inspectors who would be stationed at strategic points along the border. They would strengthen the present inspection, testing, dipping and quarantine program and also be engaged in preventing stray and smuggled animals from crossing the border and apprehending those that do. This would greatly decrease the hazards of the present situation.

(18) Increase of \$376,000 under the project, "Meat inspection," to enable the meat inspection service to meet an increasing work-load.

Problem and Need: There is urgent need for additional inspectors to meet increasing demands for Federal meat inspection and increased slaughter and processing in presently inspected establishments. Meat production and consumption in the United States are at an all-time high and still further increases are expected. There is also a strong movement towards decentralizing the industry from the large meat packing centers and this is expected to continue.

All meat packers and processors whose products are shipped in interstate or foreign commerce must have Federal meat inspection. There has been a large increase in the number of establishments requesting the inspection in order to comply with the law.

The meat packing industry is showing great concern over the shortage of meat inspectors assigned to Federally inspected establishments because of its direct influence on production costs. Inspection work is closely integrated with production facilities in a plant. Inadequate numbers of inspectors adversely affect production cost by the necessity to adjust production rates to ability to inspect. Livestock producers and meat consumers as well as meat packers benefit from efficient utilization of plant facilities. When meat packers are unable to utilize facilities suitably because of the unavailability of meat inspectors, livestock will at times back up in the yards resulting in depressed livestock prices, holdover losses to producers, increased unit production costs to packers, and higher prices to consumers.

The accompanying table and chart reflect the past demand for inspection and the amount of work anticipated in 1956 and 1957.

Plan of Work: It is proposed to add approximately 70 veterinarians and lay meat inspectors to the inspection force in order to more adequately meet the present work-load and provide for the anticipated additional work-load in 1957. As compared with the current year, this would represent an increase of approximately 2.4% in the inspection staff, which is somewhat less than the increase in work-load which is estimated as follows:

	Percent Increase 1957 over 1956
Number of plants	3.6%
Number of cities and towns	5.8%
Animals slaughtered	2.8%
Pounds processed product inspected ...	2.5%

The meat packing business is highly competitive and operations are on a "small margin of profit - quick turnover" basis. New businesses are constantly arising to replace discontinued firms. The constant shift and increase in points where inspection will be required makes it impossible to predict future points of operations except in a very general way. For many years some of the larger stations have been used as training points and the demand for inspection in smaller or isolated communities has been met by transferring trained inspectors to those points.

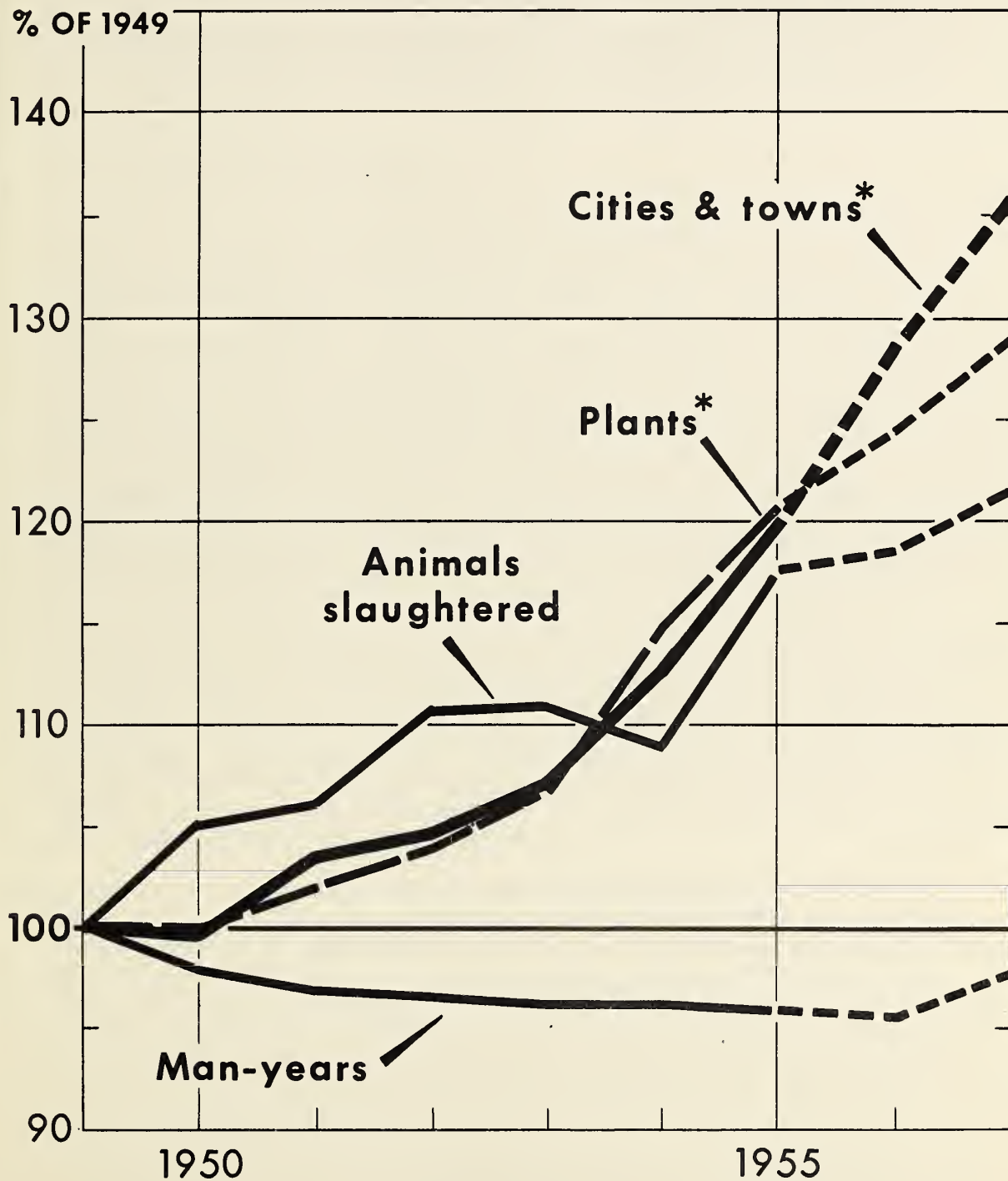
Meat Inspection

Comparison of man-power and work-load (1949 = 100%)

Fiscal Year	Man-years		Location served (end of year)		Slaughter		Volume Inspected	
	Number	% of 1949	Plants		Number	% of 1949	Pounds	% of 1949
			Number	% of 1949				
1949	3,299	100	928	100	83,458,786	100	13,381,083,144	100
1954	3,174	96.2	1,067	114.9	90,928,932	108.9	14,833,471,229	110.8
1955	3,164	95.9	1,120	120.6	98,200,397	117.6	16,373,853,029	122.3
1956 (est.)	3,151	95.5	1,154	124.3	98,500,000	118.0	16,600,000,000	124.0
1957 (est.)	3,226	97.7	1,196	128.8	101,295,000	121.3	17,000,000,000	127.0

Meat Inspection

PERSONNEL and WORK LOAD



Development Program for the National Arboretum

Legislative Authorization

Under the Act of March 4, 1927, (20 U.S.C. 191-194) the Secretary of Agriculture is authorized and directed to establish and maintain a National Arboretum for purposes of research and education concerning tree and plant life. A council created under Sec. 4 of this Act, advises the Secretary of Agriculture on planning and developing the National Arboretum.

Status of Development Program

The National Arboretum occupies a site of approximately 400 acres in the District of Columbia. Basic developmental work has largely been done. In 1947, a program which involves an estimated amount of \$3,240,243 for long-term development of the needed roads, walks, buildings and greenhouses was developed in cooperation with the National Arboretum Advisory Council. This program, however, has largely been held in abeyance during the past six years. The "Department of the Interior and Related Agencies Appropriation Act, 1956" provided \$150,000 for the construction of roads at the National Arboretum. Continuation of these funds is being requested in the 1957 Budget Estimates of the Department of Agriculture. In fiscal year 1957, \$85,000 would be used for the construction of roads and a bridge with necessary grading, and \$65,000 would be used for the construction of a motor vehicle storage and service building which will replace dilapidated structures which have been used for such purpose but which must be torn down because of the relocation of the permanent roads.

To complete the development program in future years, it will be necessary to complete the roads and bridges, develop footpaths and parking areas, construct public rest rooms and shelters, entrance gates, drinking fountains, 2 residences (one for the plant propagator, in charge of the greenhouses, the other for the resident guard) and erect the headquarters office and laboratory building which would include rooms for the herbarium, library and group meetings, construct greenhouses, and install related utilities service facilities.

During fiscal year 1955, the Arboretum was fully open to the public (with guards on duty during official hours and Saturdays and Sundays) approximately one month which was during the azalea blossoming period. In addition, the Arboretum has been open to groups upon request by appointment and to interested individuals during official hours. In fiscal year 1956 it is expected to extend the fully open period through the blooming period of additional plant groups. Assuming continuation of the current level of appropriations, by the fall of the calendar year 1957, it is expected to have the Arboretum fully open to the general public throughout the year.

A summary of the estimated cost of the development program is shown by the following table.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE

National Arboretum

	Obligations: 1948-54	Obligations: 1955	Estimated: 1956	Budget Estimate 1957	Future Years	Total
A. Development of physical facilities:						
1. Acquisition of land	\$ 286,185					\$ 286,185
2. Preparation of plans and specifications for buildings, roads, and other facilities ..	135,100				40,000	175,100
3. Buildings:						
Headquarters office and laboratory buildings						
providing rooms for an herbarium, library,						
group meetings, exhibits, and offices, and						
designed for future extensions						
Greenhouse facilities						
Residences (2):						
Propagator's residence					1,200,000	1,200,000
Guard's residence					291,000	291,000
Entrance facilities:						
Guardhouse, restrooms (including sewer lines					23,000	23,000
and septic system)	20,000				19,000	19,000
Entrance gates, drinking fountains, public						
shelters, etc.					31,000	51,000
Service Buildings:					60,000	60,000
Motor vehicle buildings and shop				\$ 65,000		65,000
Farm machinery buildings	18,000					18,000
Total, buildings	38,000			65,000	1,624,000	1,727,000
4. Roads:						
Roads (7.5 miles), bridges and roadside						
grading	146,700		\$ 150,000	85,000	155,000	536,700
9 miles of footpaths and trails, parking						
areas, and overlooks	16,000				155,000	171,000
Total, roads	162,700		150,000	85,000	310,000	707,700
5. Utilities:						
Water supply, sewage, and electric lines ...	92,900				47,000	139,900
Equipment	24,500				20,000	44,500
7. Fencing, grading, repairs and miscellaneous ..	104,858				35,000	139,858
8. Establishing library					20,000	20,000
Total, physical facilities and land	844,243		150,000	150,000	2,096,000	3,240,243
B. Operation and Maintenance	762,039	\$ 161,100	222,570	222,570	350,000	
Total, National Arboretum	1,606,282	161,100	372,570	372,570	xxx	xxx
a/ Per Annum						

EXPANDED BRUCELLOSIS PROGRAM

(Conducted with funds transferred from Commodity Credit Corporation)

	<u>1955</u>	<u>1956</u> (estimated)
Estimated obligations	\$11,581,197	\$15,000,000

Legislative Authorization

Under Section 204(e) of Title II of the Agricultural Act of 1954, Public Law 690 approved August 28, 1954, provision is made for the transfer of not to exceed \$15,000,000 annually for a period of two years from funds available to the Commodity Credit Corporation to the item "Plant and Animal Disease and Pest Control" of the appropriation "Salaries and Expenses, Agricultural Research Service," for the purpose of accelerating the brucellosis eradication program and increasing the number and amount of indemnities as an aid to the stabilization of the dairy industry.

Initiation of Program

On September 23, 1954, the Secretary approved the initiation of an accelerated program for fiscal year 1955 in the amount of \$10,000,000. This authorization was later increased on January 7, 1955 to \$12,700,000. Meetings were held with State and Federal officials and others interested to determine the most effective program to meet the needs in each State.

Indemnity per Animal

On October 8, 1954, the regulations were amended to pay maximum Federal indemnity payments of \$25 for grade animals and \$50 for purebreds. The Federal indemnity payments averaged \$20.65 per animal for 223,467 animals for which such payments were made in fiscal year 1955, as compared with \$11.71 per animal for 45,597 animals in fiscal year 1954. In addition, the State indemnity payments average \$20.85 per animal in fiscal year 1955, and \$20.64 in 1954.

Operation of Program

A comparison of the cost of the program during its first year of operation with the current, or second year, follows:

	<u>F.Y. 1955</u>	<u>F. Y. 1956</u> (estimated)
A. <u>Federal Cost</u>		
Operating funds	\$10,741,291	\$13,419,200
Indemnities	4,614,606	5,545,000
Total	<u>15,355,897</u>	<u>18,964,200</u>
Less amount provided under		
Salaries and Expenses, ARS	-3,774,700	-3,964,200
Cost of accelerated program	<u>11,581,197</u>	<u>15,000,000</u>

	<u>F.Y. 1955</u>	<u>F.Y. 1956 (estimated)</u>
B. <u>Funds provided by cooperating States and Counties</u>		
Operating funds	\$9,497,240	\$11,341,800
Indemnities	1,736,491	4,337,400
Total	<u>11,233,731</u>	<u>15,679,200</u>

The estimated distribution of the funds by States for fiscal year 1956 is shown in the accompanying table.

An appropriation to reimburse Commodity Credit Corporation for the costs of the 1955 accelerated program is being requested as a part of the 1957 Budget Estimates. An appropriation will be requested as a part of the 1958 Budget Estimates to reimburse the corporation for the cost of the 1956 program.

Outlook for Current Year

It is estimated that during the 1956 fiscal year there will be a further substantial increase in the number of cattle tested, reactors found, and calves vaccinated, as shown by the following data:

	<u>F.Y. 1954</u>	<u>F.Y. 1955</u>	<u>F.Y. 1956 (estimated)</u>
Cattle blood-tested	9,002,109	14,186,241	18,000,000
Reactors found	235,666	365,247	468,000
Calves vaccinated	3,999,101	4,381,397	5,500,000

Of the reactors estimated to be found in fiscal year 1956, it is expected that approximately 60% will be slaughtered with payment of indemnity, 21% without indemnity payments, and 19% of the reactors found will be held for later disposal, with or without indemnity.

A 5-member advisory group has been established to consult with and assist the Department in evaluating the cooperative efforts to wipe out brucellosis in dairy and beef herds. This group held its first meeting on September 8, and 9, 1955. Livestock organizations and other interested groups will be asked for their views so as to assist the group in its evaluation job.

Additional information, tables and charts relative to the 1955 program are contained in the "Status of Program" section of these Explanatory Notes.

BRUCELLOSIS ERADICATION

Fiscal Year 1956
as of November 30, 1955

STATE	FEDERAL			STATE		
	INDEMNITY PAYMENTS	OPERATING COST	TOTAL	INDEMNITY PAYMENTS	OPERATING COST	TOTAL
Alabama	100,600	294,100	394,700	-	90,000	90,000
Arizona	3,100	57,700	60,800	10,000	33,400	43,400
Arkansas	56,600	283,000	339,600	-	60,000	60,000
California	-	153,800	153,800	-	481,500	481,500
Colorado	3,600	93,800	97,400	-	23,600	23,600
Connecticut	300	27,800	28,100	-	95,900	95,900
Delaware	20,200	35,600	55,800	50,000	35,000	85,000
Dist. of Col.	-	823,600	823,600	-	-	-
Florida	19,200	224,700	243,900	30,000	236,300	266,300
Georgia	86,300	281,900	368,200	-	204,300	204,300
Idaho	37,000	268,400	305,400	1,000	100,500	101,500
Illinois	269,600	457,100	726,700	-	830,000	830,000
Indiana	244,600	479,500	724,100	-	746,800	746,800
Iowa	250,900	353,100	604,000	125,000	430,000	555,000
Kansas	-	175,800	175,800	-	40,100	40,100
Kentucky	67,400	159,300	226,700	-	128,000	128,000
Louisiana	520,800	394,000	914,800	758,600	737,600	1,496,200
Maine	30,000	85,600	115,600	20,000	89,600	109,600
Maryland	149,900	366,400	516,300	108,000	122,000	230,000
Massachusetts	10,300	50,900	61,200	-	50,000	50,000
Michigan	178,700	364,400	543,100	3,000	317,500	320,500
Minnesota	286,300	1,365,400	1,651,700	95,000	667,700	762,700
Mississippi	122,700	323,800	446,500	-	85,800	85,800
Missouri	264,400	613,000	877,400	257,200	455,700	712,900
Montana	-	375,400	375,400	-	250,000	250,000
Nebraska	138,300	549,700	688,000	648,000	-	648,000
Nevada	11,700	79,400	91,100	-	35,200	35,200
New Hampshire	9,400	31,600	41,000	18,000	74,500	92,500
New Jersey	63,100	88,700	151,800	175,000	140,500	315,500
New Mexico	11,100	93,100	104,200	7,000	14,000	21,000
New York	-	41,800	41,800	-	1,182,500	1,182,500
North Carolina	30,300	88,200	118,500	15,000	69,300	84,300
North Dakota	92,100	186,000	278,100	-	299,700	299,700
Ohio	-	179,700	179,700	-	260,000	260,000
Oklahoma	-	234,400	234,400	-	75,000	75,000
Oregon	43,000	184,500	227,500	42,100	150,800	192,900
Pennsylvania	439,600	254,700	694,300	625,000	693,500	1,318,500
Rhode Island	1,200	10,700	11,900	2,500	20,500	23,000
South Carolina	70,900	250,200	321,100	20,000	95,500	115,500
South Dakota	11,300	105,800	117,100	15,000	110,000	125,000
Tennessee	164,700	292,500	457,200	-	248,000	248,000
Texas	-	14,200	14,200	-	54,000	54,000
Utah	40,700	231,400	272,100	-	95,000	95,000
Vermont	15,000	126,600	141,600	40,000	57,400	97,400
Virginia	56,100	187,200	243,300	-	225,800	225,800
Washington	97,600	359,100	456,700	230,000	258,200	488,200
West Virginia	22,400	110,700	133,100	15,000	75,000	90,000
Wisconsin	1,471,200	1,327,700	2,798,900	985,000	754,300	1,739,300
Wyoming	8,100	127,000	135,100	-	14,900	14,900
Alaska	-	400	400	-	-	-
Puerto Rico	24,700	154,000	178,700	42,000	122,800	164,800
	5,545,000	13,417,400	18,962,400	4,337,400	11,437,700	15,775,100

CHANGES IN LANGUAGE

The estimates include proposed changes in the language of this item as follows (new language underscored; deleted matter enclosed in brackets):

- For expenses necessary to perform agricultural research relating to production and utilization, to control and eradicate pests and plant and animal diseases, and to perform related inspection, quarantine and regulatory work, and meat inspection: ***Provided further, That appropriations hereunder shall be available for the
- 1 operation and maintenance of aircraft and the purchase of (for emergency replacement only) of not to exceed one three, of which two shall be for replacement only: *** Provided further, That appropriations hereunder shall be available for uniforms, or allowances therefor, as authorized by the Act of September 1,
- 2 1954 of (68 Stat. 1114): 7, as amended (5 U.S.C. 2131):

- Research: For research and demonstrations on the production and utilization of agricultural products, and related research and services, including administration of payments to State Agricultural Experiment Stations; \$37,800,000/ \$49,972,000: Provided further, That not to exceed \$1,550,000 shall be available for construction of buildings and for the acquisition of necessary land therefor by donation, or exchange, and not to exceed \$75,000 for alterations of buildings, without regard to limitations prescribed herein.
- 3

- Plant and animal disease and pest control: For operations and measures to control and eradicate pests and plant and animal diseases *** \$18,658,700/ \$21,200,000, of which \$1,000,000/ \$1,500,000 shall be apportioned for use pursuant to section 3697 of the Revised Statutes, as amended, for the control of outbreaks of insects and plant diseases under the joint resolution approved May 9, 1938 (7 U.S.C. 148-148e), and the Act of
- 4 August 13, 1954 (Public Law 586/ 7 U.S.C. 148) to the extent necessary to meet emergency conditions: ***

- 5 Research: For the construction of roads at the National Arboretum in accordance with the provisions of the Act of March 4, 1927 (44 Stat. 1422, 20 U.S.C. 191-194), \$150,000: Provided, That the construction of said roads may be performed by the Bureau of Public Roads, Department of Commerce.

- 6 Not to exceed \$25,000 of funds appropriated under this head in the Department of Agriculture and Farm Credit Administration Appropriation Act, 1956, for research, shall be available for construction of a building at the United States Range Livestock Experiment Station, Miles City, Montana.

The first change in language proposes the replacement, by trade-in, of two aircraft and the purchase of one additional aircraft. The new planes would be safer to operate and would be similar to those used by industry. The additional aircraft would be used by the Agricultural Engineering

Research Branch for research to develop improved equipment which could be made available to farmers and others for aerial application of agricultural chemicals to control weeds, insect pests, and plant diseases. Application of pesticides and weedicides by plane is increasing rapidly, but present equipment is not satisfactory and is wasteful of materials. Better equipment needs to be devised whereby such chemicals can be applied to crops, fields, pastures, etc., uniformly and effectively and without waste.

Replacement would be made of two aircraft which are used for developing technical procedures for aerial contract specifications and control operations on plant pest control activities and for the supervision of aerial application done under contract. The contract work normally involves the annual expenditures of several hundred thousand dollars. Contract operators frequently lack experience in the specialized work required of them and deficiencies in satisfactory supervision can result in the wastage of large quantities of insecticide or the inadequate treatment of infested areas, resulting in serious crops losses. These planes are obsolete and should be replaced by new planes, which would be safer to operate and would be similar to those used by industry.

Additional explanation of the need for these planes is contained in the justifications in the Passenger Motor Vehicle and Aircraft statement.

The second change inserts the citation to the United States Code instead of to the Statutes at Large for the reference to the act of September 1, 1954, as amended, authorizing the furnishing of uniforms or allowances therefor.

✓ The third change provides for construction of four buildings and for alterations of other buildings in excess of the limitations for construction and alterations set forth in the preamble, as follows:

Construction:

National laboratory for the preservation of seed stocks ...	\$450,000
Poultry brooder house at Beltsville, Maryland	225,000
Laboratory for utilization research on citrus and other fruits and vegetables at Winter Haven, Florida	810,000
Building for storage of farm equipment at National Arboretum	65,000
Total, construction	<u>1,550,000</u>

Increases are proposed in the estimates for the construction of the first three buildings listed above and the justifications discuss in detail, under the appropriation item "Research", the need for each building.

The fourth building proposed for construction is a farm equipment storage building at the National Arboretum. The building is necessary since the present structures used for storage of equipment are dilapidated and must be torn down because of the relocation of the permanent roads now being constructed. Replacement of these facilities with a new building is necessary for storing valuable equipment so that it will not be exposed to deterioration from the elements and for maintaining it in good condition.

Construction of this building is a part of the long-range plan for the Development of the National Arboretum which is discussed separately in these justifications.

The poultry brooder house at Beltsville and the farm equipment storage building at the National Arboretum would be located on land already belonging to the government. The City of Winter Haven, Florida, has agreed to provide without cost to the government a suitable site for the utilization research laboratory in exchange for the present property now used for the citrus products laboratory which was originally donated by the City to the government in 1931. It is anticipated that the National seed storage laboratory would be constructed either on federally-owned land or land made available to the government without cost. The Colorado Agricultural College at Fort Collins, Colorado has offered to deed land to the government for the construction of the building and to provide greenhouse and other facilities. Therefore, it is not anticipated that it will be necessary to purchase any land for these buildings.

Alterations:

Connecting two small animal buildings at Beltsville, Maryland to convert them to a chemical laboratory for animal disease studies	\$50,000
Convert space no longer required for mechanical shops at Beltsville, Maryland to provide laboratory facilities needed for dairy nutrition research	25,000
Total, alterations	<u>75,000</u>

These alterations would not involve an increase in appropriations.

In animal disease studies, there is urgent need for research in a relatively new field of study on the chemical properties of viruses causing animal diseases. These diseases cause tremendous losses annually. At the present time there is no chemical laboratory at Beltsville, Maryland for such research. It is proposed, therefore, to make such facilities available by substantially altering and reconditioning two small brick animal buildings, 48' X 30' each, not now required for breeding small animals for laboratory experiments, and to connect the two buildings to convert them into a single structure about 48' X 80' and to install necessary laboratory equipment. The alterations to the existing buildings require the complete refinishing of all interior surfaces to permit ready disinfection.

For dairy nutrition research, there is urgent need for laboratory facilities for the energy evaluation of forages by means of calorimeters. The present factors concerning the feeding value of forages are not accurate and need to be determined on an energy basis. This information is required for studies of the increased utilization of forage in the dairy cow ration. A special laboratory is needed large enough to accommodate several mature dairy cows as well as to provide facilities for the chemical analysis of feeds and animal excreta. It is proposed to convert about 6900 square feet of space at Beltsville no longer required for mechanical shops. The space is convenient to the present dairy nutrition research facilities. The alterations would include installing a number of permanent partitions, extensive changes in floors and interiors of outside walls to provide for air conditioning, installing a fire proof staircase, an elevator to move items between floors, electric circuits, plumbing for water, gas, vacuum and compressed air, and other items.

The fourth change substitutes the code citation for the reference to Public Law 586, which authorized the Secretary of Agriculture to cooperate with Canada or Mexico in measures in those countries to control incipient or emergency outbreaks of insect pests or plant diseases when necessary to protect the agriculture of the United States.

The fifth change deletes language which was included in the Department of Interior and Related Agencies Appropriation Act, 1956 for the construction of roads at the National Arboretum. The estimates for the National Arboretum for fiscal year 1957 are included under the appropriation "Salaries and Expenses, Agricultural Research Service, research." The provision that construction of roads may be performed by the Bureau of Public Roads, Department of Commerce, has not been retained since such authority is already available.

The sixth change proposes deletion of the nonrecurring provision in the Supplemental Appropriation Act, 1956 for the replacement of a farm equipment building at the United States Range Livestock Experiment Station, Miles City, Montana, which was destroyed by fire in March, 1955. It is expected that this building will be constructed in fiscal year 1956 and, therefore, this provision will not be necessary in 1957.

(The following schedule reflects a more detailed analysis of the obligations shown in the regular project statement)

Project	1955	1956 (estimated)	1957 (estimated)
RESEARCH:			
Crops Research:			
Field Crops Research:			
(Production, breeding, disease, and quality investigations)			
Cereals	\$1,561,107	\$1,720,210	\$1,720,210
Cotton and other fibers	697,300	810,480	1,135,480
Forage	1,166,460	1,497,020	2,172,020
Sugar	724,170	752,530	752,530
Tobacco	353,530	362,330	468,330
Rubber, drug, oil, insecticide, tannin, flavoring, hops and special product plant investigations	173,910	186,050	336,050
Weed control investigations .	361,400	449,080	724,080
Subtotal	5,037,877	5,777,700	7,308,700
Horticultural Crops Research:			
(Production, breeding, disease, and quality investigations)			
Deciduous fruits	464,880	525,860	525,860
Citrus, avocado and other subtropical fruits	267,000	299,780	299,780
Nuts	323,510	338,520	338,520
Vegetables	777,263	784,110	887,110
Potatoes	180,480	190,350	190,350
Plants for landscaping and ornamental purposes, and farm windbreaks	369,430	389,980	389,980
Plant introduction, testing and maintenance of basic stocks	428,240	490,660	1,340,660
Investigations to reduce crop damage caused by nematodes	243,380	265,160	321,160
Basic studies of plant growth and development ...	158,740	165,180	165,180
Research on plant disease epidemics and the identi- fication of disease organisms	141,600	142,330	142,330
National Arboretum	191,930	372,570	372,570
Subtotal	3,546,453	3,964,500	4,973,500

Project	1955	1956 (estimated)	1957 (estimated)
RESEARCH--Continued:			
Entomology Research:			
Fruit insects	779,316	920,700	928,700
Truck crop and garden insects	525,080	530,900	545,900
Cereal and forage insects	569,260	597,330	685,330
Cotton and other fiber plant insects	391,370	497,750	576,250
Beekeeping and insect pathology ..	250,070	322,860	322,860
Insects affecting man and animals.	589,560	619,250	722,750
Insect identification and parasite introduction	321,060	362,560	391,360
Pesticide chemicals	485,040	578,150	660,350
Subtotal	3,910,756	4,429,500	4,833,500
Total, Crops Research	12,495,086	14,171,700 a/	17,115,700
Farm and Land Management Research:			
Soil and Water Conservation Research:			
Investigations in soil and crop management and water management on farms related to crop production:			
Humid regions	860,100	915,540	1,215,540
Irrigated and dry land regions :	1,410,913	1,491,300	1,946,300
Soil improvement, plant nutrition: and salinity control investi- gations	637,440	672,940	822,940
Fertilizers and their improvement:	342,680	365,830	365,830
Investigations of the management of agricultural watersheds for soil and water conservation and the prevention of flood and sediment damage	386,830	503,590	653,590
Subtotal	3,637,963	3,949,200	5,004,200
Agricultural Engineering Research:			
Farm power and machinery investigations	499,780	525,970	620,970
Farm structures and related investigations	260,470	318,880	408,880
Mechanical preparation and con- ditioning of farm products	547,126	567,375	584,375
Farm electrification investi- gations	214,270	279,730	401,275
Subtotal	1,521,646	1,691,955	2,015,500

Project	1955	1956 (estimated)	1957 (estimated)
RESEARCH -- Continued:			
Production Economics Research:			
Economics of production	1,397,964:	1,689,400:	2,561,400
Total, Farm and Land Management Research	6,557,573:	7,330,555:	9,581,100
Livestock Research:			
Animal and Poultry Husbandry Research:			
(Breeding, feeding, management, and meat quality investigations)			
Swine	369,880:	b/ 431,280:	532,280
Sheep and goats	420,290:	476,180:	564,180
Horses and mules	5,110:	5,480:	5,480
Beef and dual-purpose cattle ..	699,347:	773,990:	1,019,990
Poultry	831,620:	891,740:	1,231,740
Fur animals	105,410:	106,430:	106,430
Subtotal	2,431,657:	b/2,685,100:	3,460,100
Dairy Husbandry Research:			
Dairy cattle breeding, feeding and management investigations ...	594,567:	698,960:	728,960
Nutrition and physiology investigations	403,700:	496,850:	666,850
Dairy herd improvement investigations	295,100:	315,190:	315,190
Subtotal	1,293,367:	1,511,000:	1,711,000
Animal Disease and Parasite Research:			
Cattle	880,808:	1,047,850:	1,302,850
Swine	448,820:	535,330:	605,330
Sheep and goats	174,430:	204,870:	234,870
Horses	8,920:	3,670:	3,670
Poultry	451,710:	454,270:	534,270
Fur animals	44,430:	47,020:	47,020
Treatment for parasites	117,080:	121,640:	136,640
Other parasite investigations ...	78,770:	59,650:	59,650
Subtotal	2,204,968:	2,474,300:	2,924,300
Total, Livestock Research	5,929,992:	b/6,670,400:	8,095,400

Project	1955	1956 (estimated)	1957 (estimated)
RESEARCH--Continued:			
Administration of Payments to States: and Territorial Research:			
State Experiment Stations Research:			
Administration of grants and coordination of research with States	152,365	222,200	222,200
Territorial Experiment Stations Research:			
Federal experiment station, Puerto Rico	173,090	172,910	172,910
Virgin Islands agricultural re- search and extension program .	93,100	132,430	132,430
Research on agricultural pro- blems of Alaska	294,591	313,460	313,460
Subtotal	560,781	618,800	618,800
Total, Administration of Payments to States, and Territorial Research:	713,146	841,000	841,000
Home Economics Research:			
Human Nutrition Research	596,913	717,000	917,000
Household Economics Research	493,391	446,800	571,100
Clothing and Housing Research ...	332,498	362,200	362,200
Total, Home Economics Research	1,422,802	1,526,000	1,850,300
Utilization Research:			
Cereal and forage crops	1,445,231	1,513,800	1,973,800
Cotton and other fibers	1,510,810	1,762,000	2,162,000
Fruits and vegetables	1,993,850	2,047,800	2,857,800
Oilseeds	1,133,740	1,194,700	1,194,700
Sugar and special plants	924,870	920,600	1,520,600
Poultry, dairy, and animal products	1,807,280	1,970,800	2,523,800
Agricultural residues	231,060	255,800	255,800
Total, Utilization Research.....	9,046,841	9,665,500	12,488,500

Project	1955	1956 (estimated)	1957 (estimated)
RESEARCH--Continued:			
Above amounts for Utilization			
Research distributed by regions			
and commodities as follows:			
Northern Utilization Research:			
Corn, wheat and other cereal			
crops	1,070,534	1,165,100	1,490,100
Soybean and other oilseeds	471,420	506,100	506,100
Sugar and syrups	15,640	17,500	267,500
Agricultural residues	231,060	255,800	255,800
Subtotal	1,788,654	1,944,500	2,519,500
Southern Utilization Research:			
Rice	26,147	27,200	52,200
Cotton	1,346,710	1,586,800	1,886,800
Fruits and vegetables	204,200	210,200	1,020,200
Cottonseed, peanuts and other			
oilseeds	641,250	666,000	666,000
Sugars, syrups and naval stores			
Subtotal	2,544,717	2,809,200	4,119,200
Eastern Utilization Research:			
Cereal and forage crops	23,158	22,600	22,600
Fruits and vegetables	442,130	467,800	467,800
Oilseeds	21,070	22,600	22,600
Sugars, syrups, tobacco, tanning:			
materials and special plants .	481,040	495,800	545,800
Poultry, dairy and animal			
products	1,506,750	1,592,400	2,025,400
Subtotal	2,474,148	2,601,200	3,084,200
Western Utilization Research			
Wheat, rice and forage	325,392	298,900	408,900
Wool and mohair	164,100	175,200	275,200
Fruits and vegetables	1,347,520	1,369,800	1,369,800
Sugars and syrups	101,780	88,300	213,300
Poultry products	300,530	378,400	498,400
Subtotal	2,239,322	2,310,600	2,765,600
Total, Utilization Research	9,046,841	9,665,500	12,488,500
Total, Research	36,165,440	40,205,155	49,972,000

Project	1955	1956 (estimated)	1957 (estimated)
PLANT AND ANIMAL DISEASE AND PEST CONTROL:			
Plant Disease and Pest Control:			
Plant Pest Control:			
Japanese beetle	436,300	450,700	450,700
Sweetpotato weevil	215,900	220,900	220,900
Citrus blackfly and Mexican fruitfly	212,400	237,100	237,100
Phony peach and peach mosaic ..	141,300	145,000	145,000
Barberry eradication	641,300	674,700	674,700
Pink bollworm	1,191,967	1,265,100	1,265,100
Golden nematode	335,200	359,300	359,300
White-fringed beetle	682,400	713,500	713,500
Hall scale eradication	101,200	108,800	108,800
Gypsy moth	556,600	545,200	545,200
Grasshopper and mormon cricket	516,800	566,600	566,600
Insect detection and advisory service	264,000	303,800	303,800
Emergency outbreaks of insects and plant diseases (contingency fund)	616,300	1,000,000	1,500,000
Insecticide, Fungicide, and Rodenticide Act	515,500	617,000	617,000
Subtotal	6,427,167	7,207,700	7,707,700
Plant quarantine	2,650,042	3,176,900	4,143,200
Total, Plant Disease and Pest Control	9,077,209	10,384,600	11,850,900
Animal Disease and Pest Control:			
Animal Disease Control and Eradication:			
Eradicating tuberculosis	1,905,215	2,078,800	2,078,800
Eradicating brucellosis (Bang's disease)	c/3,774,700	c/3,962,400	3,962,400
Eradicating scabies	189,700	206,400	206,400
Eradicating cattle ticks	353,600	409,300	409,300
Diagnosis, control and eradication of miscellaneous diseases	136,700	234,000	234,000
Supervision over interstate movement of livestock	959,300	1,045,500	1,045,500
Administration of the Process Butter Act	8,100	-	-
Subtotal	7,327,315	7,936,400	7,936,400

Project	1955	1956 (estimated)	1957 (estimated)
PLANT AND ANIMAL DISEASE AND PEST CONTROL--Continued:			
Animal Quarantine:			
Import-export inspection and quarantine	776,153	811,500	864,500
Control of manufacture, import- ation, shipment and marketing of viruses, serums, toxins, etc.	515,700	548,200	548,200
Subtotal	1,291,853	1,359,700	1,412,700
Total, Animal Disease and Pest Control	8,619,168	9,296,100	9,349,100
Total, Plant and Animal Disease and Pest Control	17,696,377	19,680,700	21,200,000
MEAT INSPECTION:			
Meat Inspection	14,618,335	15,369,000	15,745,000
Unobligated balance	504,922	- -	- -
Pay Act Costs (P.L. 94)	[1,194,618]	[4,344,000]	[4,876,000]
Total available or estimate .	68,985,074	75,254,855	86,917,000

a/ Excludes \$50,000 transferred for fiscal year 1956 from the subappropriation "Plant and animal disease and pest control" under the authority of Section 702(b) of the Department of Agriculture Organic Act of 1944 for research on cantaloupe disease and insect problems in the Southwest (see footnote d).

b/ Excludes \$12,000 transferred for fiscal year 1956 from the appropriation "Foot-and-Mouth and Other Contagious Diseases of Animals and Poultry, Agricultural Research Service, Eradication Activities" under the authority of Section 702(b) of the Department of Agriculture Organic Act of 1944 for research to support the vesicular exanthema eradication program.

c/ In addition, advances made from the Commodity Credit Corporation, totaling \$11,558,697 in 1955 and estimated at \$15,000,000 in 1956, are made to accelerate the brucellosis eradication program pursuant to Title II of the Agricultural Act of 1954, approved August 28, 1954.

d/ Does not reflect transfer of \$50,000 for fiscal year 1956 to the subappropriation "Research" under the authority and for the reasons stated in footnote "a" above.

STATUS OF PROGRAM

The Agricultural Research Service conducts fundamental and applied research relating to the production and utilization of agricultural products, and conducts those control and regulatory programs of the Department which involve enforcement of plant and animal quarantines, the control of diseases and pests of animals and plants, meat inspection, and related work.

It carries out the Department's physical, biological, and economic science research in the fields of crops, farm and land management, livestock, home economics, and utilization.

Research is conducted at the 12,000-acre Agricultural Research Center, Beltsville, Maryland, where many projects of the Agricultural Research Service and other agencies are under way, and at numerous locations in the States, Territories and Possessions, and in foreign countries. A large part of the research is in cooperation with State agricultural experiment stations and other public and private agencies. Research is also conducted under contract with various public and private agencies and institutions.

Plant and animal disease and pest control programs are conducted to prevent introduction into the United States of pests and diseases of foreign origin, to prevent the spread interstate of those within the country, and to control and eradicate them where found. Extensive programs are conducted at numerous locations in all States and Territories on farms, ranches, sea, air and border ports of entry, public stockyards, establishments licensed under the Virus-Serum-Toxin Act, etc.

Work also includes enforcement of the Federal meat inspection laws which assures production of disease-free, clean, and wholesome meat and meat products for both civilian and military use and for foreign commerce. This is accomplished by supervising slaughtering and meat processing operations at meat packing plants, application of controls over imported meats to assure the same protection as in the case of meats produced domestically, and a system of certification of meats for export to keep foreign markets open to American meats.

CROP RESEARCH

Current activities: Investigations are conducted on the production and improvement of field and horticultural crops; on the control of crop diseases, nematodes, and weeds; on the control of injurious insects affecting farm production, and on the utilization of beneficial insects; on chemicals, including insecticides, fungicides, nematocides, and herbicides, for the control of crops pests and the development and testing of new formulations. Plant explorations are made to introduce new plants and strains as new crops or for breeding superior varieties. Work includes operation of the National Arboretum, located in the District of Columbia.

Selected Examples of Recent Progress:

Field Crops Research:

1. Yield reduction in rice caused by white tip nematode. In a cooperative State-USDA experiment during 1955 at the Rice-Pasture Experiment Station, Beaumont, Tex., it was demonstrated that the reduction in yield of rice by the white-tip nematode depends greatly on the variety that is grown and that the extent of apparent injury is not a reliable measure of the actual loss. There were marked differences in reduction in yield among the eighteen varieties that were tested. Fortuna was not damaged at all, and the reduction in yield for Rexoro, Texas Patna, and two new selections were slight. On the other hand, yields of Early Prolific, Zenith, and Calrose were reduced 40 percent or more. There was little or no relation between actual damage and the appearance of the plants in the field, at least until after the panicles or heads had appeared. For example, some plants did not exhibit the leaf symptoms often associated with white tip, but nevertheless were reduced in yield from about 12 to 50 percent. Fortuna, which was not reduced in yield, had a moderate amount of leaf infection. The reduction in yield of several other varieties which on the basis of leaf symptoms appeared to be severely damaged, ranged from about 17 percent to more than 54 percent.
2. Winter oat acreage increased. An increase of 76 percent has taken place in the past 10 years in the 13 Southern States in which oats are grown mainly from fall seeding. The total oat acreage in these States increased from an average of 5,147,000 acres in the 10-year period 1935-44 to 9,084,000 acres in 1954 and to approximately 9,922,000 acres in 1955. Almost all of this increase has been in fall-sown oats. The major reasons for this shift were the release of varieties that were crown-rust resistant and more winter hardy, and greater appreciation by farmers of the value of winter oats as a winter pasture crop and for forage. Farmers in New York, Pennsylvania, New Jersey, and in the southern parts of Ohio, Indiana, Illinois, and Missouri, are also showing increased interest in the new, more winter-hardy varieties of oats now becoming available for their areas. Data obtained from winter-hardiness nurseries indicate that Wintok withstands cold winters 40 percent more often than does the hardiest oat of 30 years ago. Outstanding winter-hardy varieties such as Wintok, Forkeddeer, Fulwin, Pantagon, and New York Sel. (C. I. 5364) are being utilized in recurrent selection, irradiation, and conventional breeding programs to produce oats with even greater winter hardiness.
3. Minland, a new rust and smut resistant oat released to farmers for growing in 1955. This new variety was developed in cooperation with the Minnesota Experiment Station from a cross of Landhafer x (Mindoo x Hajira-Joanette). It is the first oat variety to become available with a combination of the Landhafer type of high resistance to all prevalent races of crown rust, the "Canadian" type of resistance to all known races of stem rust except the relatively new race 7A, and resistance to all prevalent races of loose and covered smut of oats. It is early and essentially like the popular Andrew in yield, maturity, height, and seed

size. Although not outstanding for test weight, Minland has been superior to Clinton, Clintafe, and Andrew for strength of straw. Its outstanding superiority is high resistance to race 45 and similar races of crown rust, and to races 7 and 8 of stem rust, which have been mainly responsible for stem-rust losses in oats during the past 15 years.

4. New winter-hardy variety of barley developed. Hudson, developed in cooperation with the Cornell University Agricultural Experiment Station, is superior to the Wong variety in yield, winter hardiness, bushel weight, and scald resistance, and has equally stiff straw. Hudson is a six-row barley with rough beards or awns. Its greater winter survival should do much to make winter barley a more popular and reliable crop in New York and the States immediately to the south. In 2 years of tests, the average survival of Hudson was 76 percent, compared to 64 for Wong. In 7 years of yield tests, Hudson produced an average of 30 percent more grain per acre than Wong, the average yields being 54.6 and 41.7 bushels, respectively.
5. Record yields with Pima S-1. Pima S-1, the new American-Egyptian cotton variety, was grown throughout Arizona for the first time in 1954 and record yields of 598 pounds per acre were obtained. It was grown throughout the American-Egyptian area in 1955. The performance of this new variety confirms the results of the previous three-year tests. As a result of the impressive performance of Pima S-1 from the standpoint of both yields and mill tests, growers of this cotton have formed the "Supima Corporation" to promote the use of American-Egyptian cotton. With the increased yields, it is now possible to grow Pima S-1 profitably at lower prices. The lowered price should enable American output to compete with Egyptian imports. It should also make possible the use of this high-quality fiber in other markets.
6. New cotton varieties available. "Parrott" is a new cotton variety developed in Oklahoma especially for harvesting by mechanical stripper. It will be multiplied for release in 1956. This cotton is adapted to dryland farming in western Oklahoma, where it has outyielded other stripper varieties in tests during the past 3 years and has been superior in earliness, lint percent, and fiber coarseness. A blight-resistant variety of Acala, designated as 1517 BR, was released for production in 1955 in the west Texas and New Mexico area where blight frequently causes severe losses. This represents the first release of a commercial blight-resistant variety.
7. New varieties extend potential soybean production areas. Three new soybean varieties, Lee, Norchief, and Chippewa, were released in 1954.

Lee, adapted to the Southeast, is the first soybean variety developed in the cooperative program in which disease control was a major objective. It is resistant to bacterial pustule, wildfire, frog-eye, and target spot, and is more tolerant to root-knot nematode and much less susceptible to purple seed stain than Ogden, the most popular variety in the Southeast and the one Lee is expected to replace. Lee is adapted to portions of ten Southeastern States, and in comparison with Ogden produces higher yields and seed of much higher quality. It is probably the most shatter-resistant variety released to date and in this respect is greatly superior

to Ogden. Lee is yellow-seeded, whereas the seed of Ogden is green, an undesirable characteristic particularly in the export trade. Since a relatively high percentage of soybeans produced in the Southeast are exported, the quality and color of the seed of Lee should remove some of the objections to soybeans exported from that area. Lee is the most satisfactory variety for the irrigated areas of the Southwest that has been released to date.

Norchief matures approximately three days later than Flambeau and is adapted to the northern part of the United States. It is superior in yield to Flambeau, in lodging resistance to both Flambeau and Capital, and in oil content to Flambeau and Mandarin (Ottawa). In other important characteristics, it is about equal to these varieties. Norchief is expected to be especially useful where Mandarin (Ottawa) and Capital are too late and Flambeau is too early.

Chippewa matures approximately five days earlier than Blackhawk, yet is equal to it in yield and oil content and is superior in lodging resistance. It is adapted to an area that extends through the northern portion of the zone where Blackhawk is grown and in much of the area producing Mandarin (Ottawa) and Capital. It is of special interest to growers in areas where the high-yielding Blackhawk variety is too late.

8. Foundation seed project increases seed of superior forage crop varieties. A comparison between certified seed available in 1949 -- the year that the project was started -- and that available for planting in 1955 illustrates the rapid build up made possible with recurring supplies of foundation seed provided by this cooperative program.

	Certified Seed Available for Planting	
	1949 (lbs.)	1955 (lbs.)
Atlantic alfalfa	14,568	2,279,000
Buffalo alfalfa	324,300	8,159,000
Narragansett alfalfa	0 (1951)*	750,000
Ranger alfalfa	1,101,235	32,627,000
Vernal alfalfa	0 (1953)*	2,000,000
Kenland red clover	37,445	2,500,000
Pennscott red clover	0 (1953)*	338,900
Climax lespedeza	0 (1950)*	4,580
Tift sudangrass	0	774,000

*Denotes the year the variety was included in the Foundation Seed Project.

The 1955 supply of certified Atlantic, Buffalo, Narragansett, Vernal, and Ranger alfalfas represents the largest amount of seed of improved alfalfa varieties that has ever been available in one year. Most farmers in the northern and central alfalfa regions were able to get seed of these superior strains for their 1955 plantings.

9. Hybrids of Johnsongrass and sorghum selected for testing. These hybrids, developed in cooperation with the Mississippi Experiment Station, have been selected with a view to developing a high yielding, perennial silage crop, and sweet, persistent Johnsongrass-type strains that can be used for grazing. Seed of three of these strains has been distributed to 14 locations for preliminary evaluation. One of these hybrids is intermediate in appearance between Johnsongrass and sorghum. Each plant produces from 25 to 40 stalks that arise each year from nonspreading rhizomes. This strain grows to a height of 9 to 12 feet and has a carbohydrate content of about 12 to 15%. The other two hybrids resemble Johnsongrass, but are more vigorous, taller, and leafier. They have a carbohydrate content of approximately 15 percent. The intermediate type will be tested for silage production, while the two Johnsongrass-type hybrids will be evaluated for pasture use.
10. Emerald zoysia tested for turf characteristics. Emerald zoysia, a hybrid between Japanese lawn grass (Zoysia japonica) and Mascarene grass (Zoysia tenuifolia), developed at Beltsville, Md., has been tested for turf characteristics there and at Tifton, Ga., in comparison with the parental species and Meyer zoysia. Emerald zoysia had the best total turf rating score at Tifton. The turf was rated on the basis of texture, density, growth habit, rate of spread, browning, and color. The zone of adaptation is not fully known. At Beltsville emerald zoysia was equal or superior to Meyer zoysia in all factors, except rate of spread. Emerald zoysia combines to varying degrees the greater winter-hardiness, non-fluffy growth habit, and faster spread of the japonica parent, with the finer leaves, denser turf, and darker green color of the tenuifolia parent. Foundation stock has been released in Georgia for the production of certified planting stock.
11. Seeded pastures outproduce native range. At Mandan, N. D., over an 8-year period (1947-54), average annual beef gains per acre on moderately grazed native range have been 44 pounds, on heavily grazed native range 84 pounds, on a 1932-planted, crested-wheatgrass pasture 82 pounds, on a 1945 intermediate-wheatgrass pasture 115 pounds, and on a 1945 brome-alfalfa pasture 140 pounds. Seeded pastures performed well in 1954, when rainfall was low in April and above average the remainder of the season, but gains on native grass were much better in 1953, when rainfall was unusually high in early spring. The importance of early spring rains to native grass production and beef-cattle gains has been evident during the past two years.
12. Grasshoppers and rodents compete with cattle for forage. It now appears that cattle on moderately grazed, brush-covered range of the Southern Great Plains consume only one-fourth to one-third of the total forage produced. Yearling steers consume only 13 to 15 pounds of dry matter per head per day, yet four years of study have disclosed that an average of at least 45 pounds of dry matter per steer disappeared each day. Approximately 30 pounds of rodents were produced per acre as compared with 40 pounds of beef. During the period July 20 to September 24, 1954, grasshoppers were largely responsible for the disappearance of almost one-half of the forage. Natural factors such as hail, wind, pounding rain, leaching, oxidation, decomposition, translocation, and trampling also "used" the forage.

13. Control of weeds reduces disease in alfalfa. Observations in experimental plots at Beltsville, Md., indicate that a heavy growth of chickweed in alfalfa favored development and spread of the crown rot fungus, Sclerotinia trifoliorum. When the chickweed was controlled with a weedicide, the fungus was much less damaging to the alfalfa, presumably because of sufficient aeration around the plants at ground level to check development of the disease organism.
14. New sugar beet varieties developed. US 104, a new sugar beet, combining leaf spot and curly-top resistance, has been developed for sugar-beet districts in northern California, eastern Colorado, and western Kansas that are subject to attacks of both leaf spot and curly top. It has shown superiority over other varieties in these areas subject to both diseases. In a test at Hereford, Tex., curly top was so severe that a variety resistant to leaf spot but not to curly top yielded only 0.3 tons per acre; US 104 yielded 22.8 tons per acre, exceeding US 22/3, the standard curly-top-resistant variety, by 2.0 tons per acre. In other tests, the adequate leaf-spot resistance of the new variety was shown. US 400, which was recently released for production in Michigan, Ohio, and neighboring States is becoming very popular with growers because of its resistance to both black root and leaf spot. In 1954, approximately 15,000 pounds of seed of this variety was available for planting; in 1955, beet-sugar companies had increased the supply to 360,000 pounds. Already, however, a selection from US 400, to be released as US 401, is producing approximately 6 percent more sugar per acre in field tests than US 400.
15. Heavy losses caused by ratoon stunting disease of sugarcane. Surveys show that the virus of ratoon stunting disease is widespread in Louisiana, Florida, and Puerto Rico. Germination of inoculated seed cane was reduced between 50 and 75 percent in a study of 93 varieties in Louisiana, and there was a reduction in yield of 36 percent in first-year stubble and 22 percent in plant cane in C.P. 44-101, the most important commercial variety in Louisiana. In Florida, estimated reductions in yields of C.P. 34-79, a highly susceptible commercial variety, ranged from 30 to 50 percent. Yields of plant cane per acre from P.R. 1000 in Puerto Rico were reduced 25 percent by this virus.

It is believed that all commercial varieties are susceptible to ratoon stunting disease, which is transmitted by knives and harvesters, and is carried on infected seed cane. Hot-water or hot-air treatments are being used and may be partially effective in controlling the disease, but resistant varieties or other practical methods of control are urgently needed.
16. Effect of supplemental irrigation on yield and quality of flue-cured tobacco studied. Irrigation trials on flue-cured tobacco were conducted on the experiment stations at Tifton, Georgia and at Florence, South Carolina. The growing season at these stations was very dry. At the Georgia location, light (one-half inch) irrigations applied every three to four days were more beneficial than one inch applied at one time at weekly intervals beginning in late May. The best treatment gave returns

in excess of \$500 per acre more than the value of the unirrigated tobacco. On the other hand, there was no significant difference between irrigated and unirrigated tobacco yields at Florence, nor did increase in the fertilizer application rate result in a significant increase in yield and value when the crop was irrigated. The chemical analyses of the cured leaf from the irrigated and nonirrigated treatments for 1951 and 1952 at Florence indicate that the chlorine content of the leaf from the irrigated plots was approximately twice as great as that from the unirrigated plots. The calcium content in the cured leaf from the irrigated plots was also greater. This emphasizes the need for additional information prior to making recommendations to tobacco growers concerning the use of supplemental water for irrigation purposes.

17. Streptomycin controls bacterial leaf-spot disease of sesame. Results obtained in a field experiment at Beltsville indicate that seed treated with streptomycin may be an effective control measure for the serious bacterial leaf-spot disease of sesame. Plants grown from seed treated by soaking for 20 minutes in a solution containing 1000 parts per million of streptomycin remained free of the disease throughout the season. In a similar plot grown from untreated seed, bacterial leaf spot was very prevalent by midseason. The concentration of streptomycin used in this trial caused a slight but consistent reduction in height of the treated plants throughout the season. The streptomycin seed treatment was tested on a semi-commercial scale in South Carolina in 1955, and plot trials will again be conducted at Beltsville to determine effective concentrations for disease control that will not retard plant development.
18. Tephrosia vogelii, a very promising source of the insecticide rotenone, can be grown as a cultivated crop in the United States. In experimental plantings of this leguminous plant, prolific growth has been demonstrated within a single crop season. The active insecticidal property is mainly in the leaves and small stems, which can be readily harvested and processed. Preliminary tests indicate that the active substance may be effective on numerous insects, such as the house fly, pea aphids, and Mexican bean beetle. This species, an introduction from tropical Africa, has not flowered well in the United States, but methods have been developed for producing seed successfully at experimental stations in Puerto Rico, Costa Rica, and at Canal Point, Florida. Preliminary information obtained from small plantings made in Louisiana, South Carolina, Georgia, Florida, Texas, and California indicate that the plant is well adapted to a wide area. At present, rotenone and rotenoids are being obtained by imports of several million pounds annually of Derris roots.
19. Chemical control for annual morning-glory vines in irrigated cotton. Cotton produced under irrigated conditions becomes infested with annual broadleaved weeds and grasses after the cotton plants have become so large that they are damaged by further cultivation. Annual morning glory is particularly damaging since it twines around the plants, resulting in lower yields, reduced harvesting efficiency, and lower profits. It has been found that 3(P-chlorophenyl)-1,1 dimethylurea (CMU), applied at lay-by time as a spray directed on the soil at rates ranging from 3/4 to 1-1/4 pounds per acre, will effectively control annual morning glory in cotton.

Horticultural Crops Research:

1. Chemical growth sprays increase size and advance maturity of apricots. Experiments in Washington State have shown that 2,4,5-T sprays applied to apricots at the beginning of pit hardening resulted in a 10- to 15-percent increase in fruit size and in about 3 days earlier maturity. This material was also highly effective in retarding fruit drop of apricots prior to harvest, particularly when the embryos had been injured by frost during or shortly following bloom. It did not prevent the harvest drop of peaches when applied during the pit-hardening stage and later. Also, when the chemical was applied at a concentration of 50 parts per million, malformed peach fruits and uneven ripening resulted.
2. Hot-water treatments eliminate nematodes from strawberry plants. Several different types of nematodes, some of which have not been studied in detail, affect strawberry plantings in the United States. Plant stocks are sometimes condemned because of rootknot or other nematode infestation. Research has shown that all nematodes in planting stock can be killed by immersing the plants in water at 127 degrees F. for 2 minutes or more. Plants will survive this treatment if thoroughly dormant when treated, but not if in active growth. Plants from cold storage and those dug in mid-winter can be treated successfully. A number of commercial nurseries are now using this treatment for foundation stock, which is then planted in fumigated soil to assure nursery stock free of nematodes.
3. Copper has accumulated in citrus-grove soils. Following the finding some 20 years ago that copper as a plant nutrient was deficient in many Florida orchards, this element was incorporated in the fertilizer program. Also, copper sprays are used extensively to control citrus diseases. Research has shown recently that large quantities of copper have accumulated in the surface soil of many orchards as a result of these combined practices. The copper has not leached away, and practically all that has been applied can be recovered from the upper 12 inches of soil. Accumulation is sufficient in many orchards to cause chlorosis and other toxicity symptoms. These can be corrected in part by liming and in part by the use of phosphate fertilizers. The recognition of the copper-toxicity problem has resulted in discontinuing the use of copper in mixed fertilizers, thus decreasing the fertilizer cost as well as improving the condition of the trees.
4. Nitrogen and potassium levels studied in Washington orchards. Experiments conducted over several years have shown that Delicious and Golden Delicious apples, with a nitrogen level of 2.3 to 2.6 percent maintained in the leaves, produced optimum crops from the standpoint of fruit coloring and yield. When the nitrogen was maintained at a level higher than 2.6, no additional tree growth or yield was obtained but a reduction in fruit coloring resulted. When the level of nitrogen in the leaves was lower than 2.3 percent, fruit color was high but production and tree growth were low. Leaf samples were collected from 175 apple orchards throughout Central Washington and analyzed for nitrogen and potassium. Fifty percent of these orchards fell in the optimum 2.3 to 2.6 percent nitrogen range. Forty percent of the orchards were over 2.6, indicating excessive

use of nitrogen; 10 percent were under 2.3, indicating that more nitrogen is needed. In all instances the postassium level exceeded 1.5 percent, an amount considered fully adequate for apples. These results are further evidence that potassium for fertilization is not needed in Central Washington orchards in most cases.

5. Several new vegetable varieties introduced. Two new varieties of potato, Delus and Merrimac, have been introduced jointly by USDA and two State agricultural experiment stations--the Delaware station for the Delus potato and New Hampshire for Merrimac.

The eclipse onion has been introduced jointly with the Texas Agricultural Experiment Station. Resistant to pink root, it is a highly productive and attractive early, mild type of onion.

Badger Ballhead cabbage, developed jointly with the Wisconsin Agricultural Experiment Station, has been released to seedsmen for increase and introduction in 1955. It is a Danish type of cabbage, highly resistant to yellows, with the small heads now desired by the markets.

A new, plum-shaped, paste-type tomato, highly resistant to fusarium wilt and possessing high processing quality, was released to seedsmen under the name Roma.

The recently introduced verticillium-resistant varieties of tomato, Loran Blood and VR Moscow, proved to be the dominant varieties grown in the inter-mountain tomato districts for processing.

6. Potential uses of antibiotics extended. Antibiotics, such as terramycin, were at first believed to have potential value chiefly for killing certain bacteria that attack plants. Recent work shows, however, that terramycin also controls various fungus diseases, such as bean rust and downy mildew of lima beans. Its effectiveness against additional bacterial diseases, including angular leaf spot of cucumber and bacterial spot of pepper, was also established.
7. Yield of bush lima beans increased by chemical application. 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) applied at an early stage of growth as an aqueous spray (1.5 parts per million concentration) caused Fordhook 242 lima beans to drop their early flowers and later develop into plants two and a half times the size of unsprayed ones. In field trials, yield increases of 200 to 300 pounds per acre of fresh beans resulted from the spray treatment.
8. Chemical spray removes fruit of ginkgo. The ginkgo (Ginkgo biloba L.), a highly prized ornamental tree for park, street, or home planting, has been planted extensively in Washington, D. C. A serious objection to its wider use is the foul-smelling fruits of the female tree that fall to the ground each fall. During the past year it was found that applying a spray of isopropyl-N-(3-chlorophenyl) carbamate (3-Cl-IPC) to the trees when the fruits were relatively young caused them to cease developing and fall off. The results of experiments conducted cooperatively with the National Capitol Parks Service, U. S. Department of the Interior, indicate that sprays of 250, 500, or 1000 parts per million concentration,

when applied early (12 days after flowering), caused 100-percent fruit abscission, while similar sprays applied to more mature fruits 37 days after flowering were only slightly effective (0-to 33-percent removal). No foliage or twig injury resulted from any of the sprays.

9. Bamboo pulp examined as potential source of paper. Through a Government research contract placed with the Herty Foundation of Savannah, Ga., the fiber qualities of 21 kinds of bamboo were examined as potential sources of paper pulp. It appears that any of the kinds studied could be used for paper making. The types of papers for which they appear best suited are those for which softness and absorptivity are essential. Some of the papers for which bamboo pulps appear eminently satisfactory are cable insulation, fruit wrapper, pattern, industrial saturating, toweling, absorbent wadding, bible, bread wrapper (waxed), cellulose filter media, cigarette, and sanitation papers requiring softness. In blends, bamboo papers can be used to make fine quality writing paper and airmail stationery. This work was done under the project for the development of new crops for domestic production.
10. New plant drug for high blood pressure tested clinically. In a cooperative program with the National Heart Institute, many plant collections have been examined chemically and clinically for their effect on the heart. Andromedotoxin, a substance extracted from our native Rhododendron maximum, is now being tested clinically on humans. One life was saved by it recently when other drugs were not effective. The seeds of a tropical tree in Puerto Rico were found to be a new source for the drug Bufotenine, a valuable narcotic for heart and mental conditions.
11. Benefits to the farmer through plant introduction reported. Recent information reported through various State and Federal experiment stations demonstrates how foreign plant material is utilized by breeders.

The New Hampshire Agricultural Experiment Station has distributed a new, extremely hardy, freestone peach under the varietal name "Sunapee." Its cold-hardiness was derived from material collected in the Caucasus Mountains of Russia. The Mysore raspberry introduced from southern Asia and tested at the Subtropical Experiment Station at Homestead, Fla., has proved well adapted to southern Florida. It is the only raspberry which will grow in this area and is planted widely in home gardens. Introductions of walnuts from northern China have been found well suited to Oregon conditions. Two varieties, "Manregion" and "Adams", have been selected from the original introductions. The recently released large-fruited tomato variety "Double-rich", notable for its high vitamin C content, obtained this valuable character from a wild tomato obtained in Peru.

Plant exploration programs during the past year brought in 4,730 grasses and 1,354 legumes from southern Asia for trial in the United States. A recent survey indicates that 45 grass introductions and 30 legumes brought in since 1948 are either now in breeding programs or are being released for commercial production.

12. Light profoundly affects fungi. Current studies show that light profoundly affects the production of spores and sclerotia and other growth responses of many fungi. For example, Sclerotium rolfsii, the cause of soil-borne diseases of many crop plants in the South, formed sclerotia only if the cultures received light. However, a light period of 25 minutes given only once was adequate, particularly if given when the cultures had grown 5 days in darkness. Knowledge of the light requirements of Sclerotium rolfsii is necessary in devising ways to combat this important crop pathogen. Similarly striking results have been obtained with light in controlling spore formation of other fungi.
13. Recent progress made at the National Arboretum. Considerable repair work has been necessary at the National Arboretum following the severe storm and hurricane damage of 1954. However, repairs have been largely completed, with permanent improvement of floodwater drainage conditions in local areas and with removal of 100 felled trees from the major planting sites. Where the replacement of top shade was necessary for the established collections, 45 shade trees up to 30 feet in height have been transplanted, while 80 nursery-size specimens have been added for future development in the same areas.

New accessions since October 1954 have totaled over 1400 plants in approximately 750 varieties including 500 deciduous azaleas received from foreign nurseries, numerous camellias, and 42 varieties of lilacs contributed by a local horticultural organization. The care and handling of such small-sized plants has been greatly facilitated by construction of a lath-covered shade house equipped with overhead irrigation.

While minor additions have been made in several of the permanent plantings, principal progress has centered on the development of the new camellia area and on major additions to the dogwood planting and to the oriental plant collections of Cryptomeria Valley. Such development has included the construction of new trails as well as soil preparation and planting.

Public interest was evidenced by the attendance of more than 45,000 visitors during the four weeks that the Arboretum was open in the spring of 1955. Numerous organizations have been conducted on scheduled tours and many such visitors have expressed appreciation of the descriptive folders now available and of the continued progress being made in the provision of display labels for the plant collections.

14. Comparative tests made of time of fertilizing peaches. In a test at Beltsville, the time of application of nitrogen fertilizer was compared on three peach varieties. Applications were made on October 1 and March 1, plus a split application--one-third in October, one-third in March, and one-third in June. The size and yield of fruits were greatest from nitrogen treatments received in three applications. There was no significant difference in fruit coloring following the different times of application of nitrogen in the Halehaven and Triogem varieties. In Elberta, however, the color was greatest when nitrogen was applied only on October 1.

15. Arsenic toxicity corrected by a new complex chemical form of zinc or iron. It is extremely difficult to establish young peach trees or other stone-fruit trees on land previously planted to apples in the Pacific Northwest. This is due to the high arsenic content of the soil, resulting from heavy applications of arsenate sprays in the past. Previous work established the value of zinc-sulphate applications to the soil for correcting the arsenic toxicity to young peach trees. Recently experiments have shown that both zinc and iron in a new complex known as the "chelated" form are much more effective than zinc sulphate in correcting arsenic toxicity. They may be applied either as foliage sprays or soil applications. In experiments in several orchards, the zinc chelate was slightly superior to the iron chelate for correcting this trouble. One-half pound per tree of either chelate was sufficient to correct arsenic toxicity in some soils, while others required two pounds per tree to bring about definite improvement. Spray applications of the zinc chelate gave partial correction of the trouble. Treating apple and pear trees during the first growing season, however, proved ineffective. Through the use of these chemicals it now appears possible to replant old apple land with stone-fruit trees without the necessity of bringing in virgin soil.

Entomology Research:

1. Effective larval control demonstrated for the vector of a malaria-like disease of turkeys. A malaria-like disease known as leucocytozoon causes high morbidity and over 5 percent mortality of turkeys in Jasper County, South Carolina. One of several kinds of black flies in the area has been identified as a vector of the disease. It has been shown that black-fly larval breeding in streams can be controlled with light applications of DDT-oil solution. The results suggested that it would be feasible to treat streams, thereby minimizing adult fly populations and transmission of the disease. Research is under way to determine the size of area to treat to minimize adult black-fly infiltration from untreated areas, the duration of effectiveness of treatments, and the effect of control on the incidence of the disease in flocks of turkeys.
2. Principal species of caterpillars attacking cabbage are controlled with endrin. Experiments have shown endrin to be more effective than all other insecticides tested against the principal species of caterpillars attacking cabbage, particularly the cabbage looper, imported cabbageworm, diamondback moth, cabbage webworm, fall armyworm, and corn earworm. Two applications of this insecticide during the pre-heading stage of plant growth gave an average 98-percent reduction in caterpillar populations on late-spring cabbage and similar reductions on fall-grown cabbage. This finding is of particular importance because the cabbage looper and imported cabbageworm in some areas have become resistant to DDT, which has been widely used by growers to control these pests.
3. New insecticide shows outstanding promise for control of several major cotton pests. In laboratory and field cage tests, Bayer 17147, a benzotriazine derivative of a methyl dithiophosphate, was highly effective against the boll weevil, bollworm, pink bollworm, cotton aphid, spider mites, cotton leafworm, brown cotton leafworm, flower

thrips, and cotton fleahopper. It is the first compound ever tested that was effective against this range of cotton pests.

4. Progress made in mass-rearing and determining the nutritional requirements of the pink bollworm. In an attempt to develop methods for mass-rearing pink bollworms for use in research investigations, it has been found that the larvae will feed and develop normally on fresh garden peas. Larvae were placed on peas which had been individually wrapped in pieces of absorbent cotton and autoclaved for 15 minutes at 15 pounds pressure. Normal moths emerged, mated, and deposited fertile eggs. In studies being conducted to determine the exact nutritional requirements of the pink bollworm, a new synthetic medium based on casein has been developed in which larval development is comparable to that obtained when the larvae feed on cotton bolls. By using this basal diet and altering the various nutrients, it is believed that the exact nutritional requirements may be readily determined.
5. Procedures developed for mass production of pink bollworm parasites. In order to provide large numbers of introduced parasites for use against the pink bollworm of cotton, methods were developed for the mass production in the laboratory of four species of parasitic wasps. The methods required using substitute hosts for the parasites and devising suitable techniques and equipment for laboratory use. These new procedures have permitted supplying parasites for field release during periods most favorable for their establishment on the pink bollworm.
6. Bees active in cotton pollination. In an experiment made cooperatively with the Arizona Agricultural Experiment Station with the Pima S-1 variety of cotton caged with and without bees, the yield of cotton with bees was 24.5 percent higher than that obtained without bees. In 1954 a field test was run to determine the practicability of producing hybrid cotton seed through the use of honey bees to effect cross pollination. Seven hundred colonies of honey bees were scattered in groups of 20 to 40 colonies close to a 10-acre plot planted to alternate rows of Pima S-1 varieties of cotton. The flowers of the two varieties were so cross-visited by the bees that the stigmas of most of the flowers became well coated with pollen. Flowers in cotton fields more than 1/2 mile away were not so well visited or pollinated. The amount of crossing of the two varieties will not be known until the crop produced from the seed planted in 1955 is harvested. However, if only 50 percent of the blossoms prove to be pollinated, the experiment would indicate that the commercial production of hybrid cotton can be made a practical reality by the use of bees.
7. The "yellow clover" aphid has become a serious pest of alfalfa. An aphid first identified as the yellow clover aphid, now officially known as the spotted alfalfa aphid, became a serious pest of alfalfa in the Southwest during 1953 and 1954. It is spreading into new alfalfa growing areas. Cooperating State workers have shown that several insecticides will control the pest but treatments must be made at frequent intervals at high cost to growers. In preliminary work conducted in California at least two strains of alfalfa show resistance to the insect. These findings are encouraging to researchers trying to find a more satisfactory means of controlling the pest. Further work

is in progress to confirm these early findings and to determine the usefulness of the resistant alfalfas in the alfalfa breeding program.

8. Progress made in study of the mite vector of wheat streak-mosaic.
The wheat curl mite, a most important vector of the wheat streak-mosaic virus, is able to live on a large number of varieties of wheat, barley, corn, sorghum, and Sudan grass, and on 12 species of wild grasses. It has transmitted the mosaic from wheat to all of the wheat and barley varieties tested and to a number of oat varieties and wild grasses. Four agropyron-wheat hybrids from Canada, however, are immune to the virus and resistant to the mite and may be suitable material for breeding resistance to the mite into satisfactory wheats.
9. Several important additional species of stored-grain insects identified in the United States. Identification of material assembled during surveys for the khapra beetle, conducted by the Agricultural Research Service and Agricultural Marketing Service, reveals the presence of several additional beetles which are stored-grain pests. Trogoderma boron has been found widespread in the west-central States, and appears to be an important pest in parts of Kansas. Other less important pests of grain that have been identified from the southwestern United States are T. parabile, T. simplex, and Attagenus alfieri. Perimegatomia vespulae has also been encountered in wheatgrass seed in California. Prior to these identifications, little was known about the distribution of these various pests, and A. alfieri was not previously known to occur in North America.
10. Insecticide residue investigations intensified. As a result of the recent announcement by the Food and Drug Administration of tolerances for residues of a number of pesticides on fresh fruits and vegetables, and the responsibility of the Department of Agriculture for making recommendations on the necessity for using pesticides in food production, work is being intensified on insecticide-residue studies.

For example, demeton residues were determined on cantaloupes, potatoes, apricots, peaches, prunes, apples, apple and cherry leaves, pea vines, pods, and peas, and clover. Residues of demeton were higher on leafy crops and foliage than in fruits. Pea vines contained 8 parts per million of demeton 2 weeks after spraying with 1.5 oz. per acre, but the peas and pods contained no residue 26 days after. Peaches seemed to retain more demeton than other fruits containing 1.6 parts per million of demeton 49 days after spraying with 6 oz. per acre.

DDT residues were determined at harvest time on apples from 12 commercial orchards in the Middle West. In nearly all cases the residues were less than the tolerance of 7 parts per million set by the Food and Drug Administration. In 2 orchards that had received DDT sprays within 25 days of harvest, the residues were from 7 to 10.5 parts per million.

Encouraging results were obtained in residue-removal studies. Malathion residues up to 20 parts per million on kale, snap beans, okra pods, beet tops and roots, and tomato fruits were reduced to less than 1 part

per million after washing the treated vegetables for 60 seconds. The residues on treated lettuce and broccoli were reduced to 2.3 parts per million or less. Thus, malathion may be safe to use on leafy vegetables up to the time of harvest, provided the treated products are washed with water before they are processed or consumed.

11. Diazinon indicated as promising control against insects and mites on apples and pears. Experiments in Washington, Indiana, and West Virginia indicated that Diazinon may control a wider range of the more serious pests of apples and pears than any single insecticide now in use. It compared favorably with DDT against the codling moth and gave good control of the plum curculio, apple aphid, Forbes scale, orchard mites, and pear psylla. The quantity of the formulated material used varied from 1/2 to 4 pounds per 100 gallons of spray. However, recommendations for its use must be held in abeyance pending additional toxicological and residue data.
12. Systemic insecticides found effective in preventing fruit fly development. The systemic action of demeton at 2 pounds per acre prevented development of induced oriental fruit fly infestation in guavas for 56 days and was 97 and 90 percent effective 63 and 77 days after application. In other tests with demeton, high application rates did not compensate for lack of thorough coverage. Demeton also showed promise against the Mediterranean fruit fly, a single application of 10.7 pounds per acre reducing the infestation in Jerusalem cherries 99, 86, and 69 percent after 1, 2, and 3 months. Smaller amounts were equally effective but for correspondingly shorter periods. American Cyanamid experimental systemic compounds 12008 and 12009 and Shell OS-1836 are also promising for controlling fruit flies but their effect is of shorter duration than that of demeton. These treatments will not be recommended for commercial use until further studies indicate that harmful residues will not remain on or in harvested fruit.

FARM AND LAND MANAGEMENT RESEARCH

Current activities: Soil and water conservation research is conducted to develop improved or better soil and crop management practices; to improve irrigation and drainage methods and reduce soil salinity problems; to develop information on watershed hydrology, the sedimentation of streams and reservoirs, the design and hydraulics of structures, and the engineering phases of irrigation and drainage; to improve fertilizers and liming materials; and to determine the relation of soils to plant, animal and human nutrition. Agricultural engineering research is aimed at the mechanization of crop production, the development of better types of farm buildings and equipment for livestock and for on-farm handling, storing, and conditioning of farm commodities, and the development of new farm uses for electric energy and the adaptation of electrical equipment to farm use. Economics of production research is conducted on profitable adjustments in farming by type and size of farm; relation of these adjustments to costs and returns and to total farm output of different products; efficiency in use of labor, equipment, land, and water; profitableness of new and improved farming techniques; inventory and analysis of land resources; and problems of farm valuation, taxation, debt, tenure, risk and insurance.

Selected Examples of Recent Progress:

Soil and Water Conservation Research:

1. New system of quarterly progress reports developed. These reports provide a quick way of making research results available to field workers of the Soil Conservation Service and the Federal Extension Service, as well as to other Department agencies for their information. The first three reports carried nearly 200 pages of data and interpretation. The Soil Conservation Service formally reports research needs, and this helps to keep the research program oriented with respect to field problems. Research workers also answer inquiries and participate in many conferences and field inspections dealing with specific problems on the land.
2. Simpler, less costly drainage practices developed for Coastal Plain soils. Lack of adequate drainage is a hazard to crop production on many of the southern Coastal Plain soils. On fine-textured soils at Fleming, Georgia, water does not move into and through the soils sufficiently to permit drainage by either deep ditches or tile. In this area, it has been found relatively easy to remove the excess water by surface drainage. In like soils in Virginia, where quarter drains conventionally spaced 150 to 175 feet apart are constructed to carry water from rows and depressions to lateral ditches, it has been found that bedded rows, with a small but uniform grade in the channel between the rows, would permit spacing of quarter drains up to 600 feet apart. This reduces costs, since these drains require expensive hand labor for their maintenance and also interfere with the use of high-speed farm machinery.
3. New tillage methods combine efficiency with conservation. At LaCrosse, Wis., corn having a surface mulch of 2 tons of corn stalks per acre lost only .05 inch of water and .05 ton of soil per acre during the growing season. During the same period, comparable plots of corn without a mulch lost 1.23 inches of water and 5.60 tons of soil per acre. Successful mulch tillage requires high fertility levels, especially sufficient nitrogen. Where fertility levels have been adequate, corn yields have been as high with mulch tillage as with conventional soil preparation. In Maryland, corn planted with the planter drilling in the tractor tracks on a rough seedbed encountered no serious weed problems and yields were as good as on thoroughly fitted seedbeds. The loose seedbeds maintained their porous condition throughout the season, which favors rainfall infiltration and reduces runoff. Based on custom rates for tillage operations, costs of corn production can be lowered by about \$5.00 per acre by using minimum-tillage methods.
4. Wide-row corn and intercropping found successful as a conservation practice. Corn rows spaced up to twice the conventional width, with strips of undisturbed sod between the rows and with meadow seedings in the corn, can be used on many farms for improved erosion control and to eliminate low-income nurse crops from the farming system. In 1954, corn grown in Illinois in 40-inch rows, with a strip of living intercrop kept less than 6 inches high, yielded 103 bushels per acre,

the same as corn grown by conventional tillage. Corn planted in alternate 40- and 80-inch rows, with a living intercrop in the 80-inch space kept less than 6 inches high, yielded 94 bushels per acre. Under favorable moisture conditions, meadow seedings have been successfully established in wide-row corn, but they were not successful where moisture was critically deficient.

5. Wind erodibility of field surfaces can be estimated. Estimates of probable soil losses by wind erosion in advance of the windy season not only provide a warning that emergency control programs may be needed, but also point out the degree of roughness or soil cloddiness required in emergency-tillage operations to supplement vegetative cover on farms in the dry-land regions. Research at Manhattan, Kan., with a portable wind tunnel has shown that there are three main factors that govern the loss of soil by wind erosion--namely, surface roughness, soil cloddiness, and crop residues on the surface. After obtaining the values for surface roughness, amount of residue, and cloddiness, a chart is used to estimate erodibility. If the erodibility value thus determined is less than 0.25 ton per acre, the soil is sufficiently protected by clods, ridges, or vegetative cover to make it essentially non-erodible. If this value ranges from 0.25 to 5.0 tons per acre, the erodibility ranges from slight to moderate and the land is only partly protected from erosion. If there is a greater erodibility than 5.0 tons per acre, the soil is evaluated as being highly vulnerable to wind erosion.
6. Water spreading replenishes ground water for irrigation. Research at Bakersfield, Calif., is developing the science and practice of recharging underground reservoirs by water spreading. A team approach to the problems of replenishing ground water is being made by scientists trained in irrigation engineering and soil science. Their accomplishments include: (1) development of criteria for selecting water-spreading areas; (2) determination of factors influencing water intake into spreading areas and limiting recharge of underground water-bearing strata; (3) improvement of water-intake rates by the use of mechanical treatments, grass cover, crop residues, soil conditioners, and the reduction of microbial activity; (4) evaluation of shaft, trench, and pit injection methods, which cut through less pervious soil material; (5) evaluation of operational procedures such as cultural treatment of the sites, length of wetting and drying periods, and surface heads.
7. Simple tests developed for measuring salinity and sodium in soils and irrigation water. Portable instruments for measuring the salinity of soils and irrigation waters in the field have been developed at the U. S. Salinity Laboratory. These instruments will facilitate and greatly increase the number of salinity measurements made for agricultural diagnostic purposes. The basic instrument employs an inexpensive buzzer and earphone, a single flashlight battery as the source of current, an automatic built-in temperature compensator, and a small, inexpensive conductivity cell. The companion instrument is a portable, manually-operated vacuum filter for obtaining saturation extracts from soil. Simplified tests based on these instruments have been devised which are suitable for measuring the salinity and sodium content of soils

and irrigation waters, the gypsum content of soils, and the quantity of amendment required to replace exchangeable sodium in problem soils.

8. Improved planting methods reduce salt hazard. Some very useful information has been obtained on the interaction of planting methods and salinity in the germination of seeds of irrigated row crops in soils having slight to moderate salinity. Alternate furrow irrigation decreases salt injury in single-row beds as compared to irrigation in every furrow. The use of low beds, three to four inches high instead of the usual six inches, results in greatly improved seedling emergence on saline soil. Sloping beds are most effective in reducing the salt hazard, and a method has been devised by which conversion to flat beds following emergence is possible. By this technique, it is possible to combine the advantages of sloping beds for emergence and flat beds for later cultivations.
9. Progress is made in reclamation of highly saline sodium soils. The highly saline sodium (alkali) soils which occur in some parts of California's Coachella Valley may be reclaimed faster and more economically than ever before. Previous attempts by farmers to leach these lands have not been successful, because the sodium caused a low rate of water intake. Even with the addition of gypsum to the soil before leaching, reclamation still is not very rapid. Mechanical mixing of the soil to a depth of 42 inches increases the rate of water intake ten times or more, and is cheaper than gypsum. Mechanical mixing in combination with gypsum is better than either alone, and is recommended especially when the time that land is out of production becomes an important economic consideration. This research work was conducted cooperatively with the California Agricultural Experiment Station, the Coachella Valley County Water District, and the Bureau of Reclamation.
10. Synthetic nitrogen fertilizers of low solubility reach commercial scale production. Studies have now developed a new class of nitrogen fertilizers, comprising reaction products of urea and formaldehyde, which have high nitrogen content (37 percent) but low solubility. As compared with the high-nitrogen materials commonly used, these products have excellent physical properties. They resist leaching from the soil, and a single application will supply the entire nitrogen requirements of long-season crops. Continuous procedures have been developed for making these products and one product of this class has been announced for large-scale commercial production.
11. Surface-active agents found which improve physical condition of fertilizers. Hardening of fertilizers has long presented serious problems in the manufacture, storage, and distribution of many kinds of non-granular products widely used in large areas of the country. Previous investigation on improvement in the physical condition of fertilizers has included the use of conditioning materials, such as oilseed meals, hull meals, other plant residues, and industrial byproducts. Recently widespread use has been made by industry of certain organic compounds known as "surfactants" for this purpose, but these compounds have not insured the elimination of caking under the variable conditions encountered in commercial practice. Studies have shown, however, that

under certain conditions adding small quantities of some types of surface-active agents in the preparation of superphosphate reduces subsequent hardening of this material and improves its behavior in handling and distribution. Evidence was also obtained that surface-active agents improve the efficiency of ammonia absorption in the preparation of mixed fertilizers and tend to reduce the subsequent hardening of mixtures that are shipped immediately after manufacture, as is usually necessary during the height of the fertilizer season.

12. Tentative guides released for stream-bank control. Continuing and intensive research studies of stream-bank erosion in the Buffalo Creek Watershed in New York are yielding valuable results. These indicate that placement of rip-rap and vegetal controls along creeks and headwater streams can be related to the geometry of the channel itself. This insures that bank protection can be more efficiently placed to anticipate the location and intensity of bank attack. A recent flood provided good verification of developed theories.
13. Carrying capacity of grass-lined channels computed. Results obtained over a period of years from studies on hydraulics of grass-lined channels make it possible to compute the carrying capacity and know the maximum permissible velocity of water in terrace outlets and spill-ways when lined with grasses normally available. More recently, the emphasis has been on determining the effects of crops, such as wheat in 7-inch rows and tall sorghum in 40-inch rows, on flow in terrace channels. Results from channel-lining studies are used to guide installation of water-disposal systems for terraces and other waterways by conservation workers.
14. Straight-drop spillway put to severe test. The St. Anthony Falls Hydraulic Laboratory reported last year the development of the straight-drop spillway stilling-basin for generalized application as a water-control structure, so that design engineers can apply this effective and economical design rather than devise separate, individual plans. As a means of further refining this device, a scale model proposed for use in the Walnut Creek Pilot Watershed in California was installed in the Laboratory and tested in May. The spillway required for Walnut Creek was much larger than had been contemplated when the straight-drop spillway stilling-basin studies were conducted. Its requirements provided a very severe test of the design criteria and the generalized design procedures. In spite of the fact that it was necessary to extrapolate far beyond the range previously contemplated, the extrapolated proportions proved to be entirely satisfactory. Hence, construction of the actual spillway could be carried out with confidence in its successful operation.
15. Drain-tile study initiated. Despite the fact that thousands of miles of drain tile are installed annually, little research has been done on the basic but immediately practical question of proper angle for joining a lateral to a main drain line. Initial tests indicate that a simple 90° angle between lateral and main-line tile is satisfactory, and that there is no need for the more costly, hand-placed junction with an acute angle which has been commonly used.

16. Method developed for measuring the effects on animals of feeding crops grown on deficient soils. Bone development was found to parallel gain in body weight when bull calves were fed at three levels of nutrition in cooperative studies with Cornell University to evaluate the effect of quality of nutrition on the growth and development of dairy cattle. This indicates that physiological, as well as physical development, is delayed in the underfed animal. During these studies, methods were developed that made possible the determination of molybdenum in a small quantity (about half a teaspoonful) of blood serum. Use of this method, plus a knowledge of normal levels of molybdenum in the blood, permits the rapid diagnosis of molybdenum toxicity in cattle. It will be of great assistance in delineating soil areas where molybdenum toxicity is incipient, as well as charting the definitely toxic areas.

Agricultural Engineering Research:

1. Methods studied for protecting animals from summer heat. Research in several widely scattered locations, under various climatic conditions, has established that high temperatures and hot sunshine in summer cause more loss of beef, dairy, hog, and poultry production than ordinary winter temperatures. Cooperative studies in the Imperial Valley have shown the usefulness of improved types of shade for cattle, adaptations of evaporative or "desert" coolers, spraying animals with water, cooling the drinking water, and use of wire instead of the conventional plank fences around feeding lots. One satisfactory combination of low-cost protective features was tested in the summer of 1954. A feed lot and improved cattle shade were located in an alfalfa field away from other buildings and fenced with woven wire to obtain free air movement and minimum reflected heat. The drinking water was cooled to 65°F. The animals in this lot, over an 84-day feeding period, made an average gain of 1.94 pounds per day compared to 1.51 pounds for similar animals provided with similar shade but in a plank corral. Also the animals in the wire pen made this more rapid increase with 234 pounds less feed per 100 pounds of gain.
2. Hose pump for metering liquid fertilizer improved. A practical, inexpensive pump for application of liquid fertilizer in the field has been developed through redesign and improvement of a pump developed in principle several years ago by the University of Tennessee in cooperation with the Tennessee Valley Authority. A number of plastic hoses, stretched over a rotating-rod reel which is ground driven, meter liquid fertilizer without the fertilizer coming in contact with moving metal parts. The amount of fertilizer applied per acre is not affected by variations in ground speed. Cooperation with a manufacturer who has adopted this principle resulted in 500 of these pumps being sold since its improvement.
3. New equipment for handling gin and oil mill wastes proves effective in killing pink bollworms. As a result of research conducted jointly by entomologists and engineers, ginners and oil-mill operators are able to obtain substantially 100 percent kill of all pink bollworms remaining in wastes from ginning and oil mill operations. The characteristics, speeds, and sizes of fans which will accomplish this purpose have been worked out largely at the Mesilla Park Cotton Ginning Research Laboratory and are being adopted by the industry.

Prior to these developments, considerable expense was involved in fumigating or otherwise killing the worms in gin trash, before it could be removed from the plant. Since most gins use a fan for handling gin waste there is little added expense for equipment needed to meet control requirements. This development is of great importance not only as a measure of control to impede spread of an important insect pest but also to permit the use of gin wastes in some areas where gin trash is hauled back and spread on the land for erosion control and soil building. Rules and regulations based on this research are being prescribed by the State Pest Control authorities and installations are being approved for treatment for use in area of origin.

4. New mechanical silage feeder reduces hand labor. A mechanical feeder, operated by a 3/4-horse-power electric motor, provides simultaneous feeding of silage in a long feed bunk. The feeder loads a moving belt of the same length as the feed bunk and then inverts the whole conveyor. This has eliminated winter freeze-ups and reduced crowding by animals trying to get to the feed bunk. The new feeder was developed in cooperation with the Illinois Experiment Station. It has been used on a farm during two feeding seasons and has reduced by two-thirds the time spent in feeding.
5. New planting attachment gives better emergence of cotton. An attachment for use with lister planters in the sub-humid cotton-growing area of the Southwest features a narrow furrow opener and seed press wheel with soft rubber tire, which presses the seeds into firm moist soil before they are covered. The correct placement and uniform shallow covering afforded by this attachment helps overcome drying out of the seed because of too little soil covering, or failure to emerge due to too much covering. Approximately 15,000 units have been manufactured and put into use during 1954. Wide adoption of this development could result in large savings to cotton farmers by reducing or eliminating costs of replanting.
6. New designs for beef-cattle structures developed. As a result of the wide interest in cattle raising in the South, 36 plans for various types of cattle barns and equipment that help make operations more efficient have been developed in cooperation with southern States. In the design of these structure, emphasis has been placed on economy of construction and on self-feeding to minimize labor. Included are a variety of plans for equipment, such as movable self-feeders, feeding troughs, calf creep feeders, corrals, cattle stocks and squeezes, loading chutes, and cattle guards. These plans have been published in Agricultural Handbook No. 81, "Cattle Shelters and Equipment for Southern States", which is being placed in all county agents' offices in 13 Southern States by the Extension Service. Farmers can select the plans they want from this publication and obtain the working drawings at nominal cost either from their county agent or from their State college.
7. Labor-saving equipment developed for beekeepers. A new method has been developed for uncapping honeycombs by an electrically heated pin-roller. It promises to reduce the hand labor required for uncapping, which is one of the most laborious operations in producing honey. Two devices for tipping beehives, which reduce considerably the hand labor required for

handling hives, have been developed in Wisconsin. One, completely automatic, is attached to the hydraulic tailgate of a truck. It is excellent for the beekeeper with a large number of colonies that must be moved often. The second is a lower-cost, hand-operated tipper designed for smaller operations.

8. New method of curing Virginia-type peanuts developed. With this new method, the peanuts are pulled by machine and allowed to cure in windrows for about 6 days. This does away with the conventional hand method of stackpoling. The peanuts are then harvested from the windrow with a combine and dried to safe moisture content with forced air heated 20°F above atmospheric temperature. The peanuts produced have as good or better flavor than those cured by the conventional stackpoling method. If widely adopted, this method should save peanut growers large sums in labor, and in materials for stackpoles.
9. Curing environment affects tobacco quality. A marked improvement in quality of dark-fired tobacco can be caused by a small change in air moisture during certain stages of the curing period, according to experiments conducted in Tennessee. The difference in quality can increase the sale price of the tobacco as much as \$8.00 per hundred-weight (a gain of 16.7 percent). Electrically operated equipment and controls, which are readily available, make adoption of this method suitable for most growers of dark-fired tobacco.

Production Economics Research:

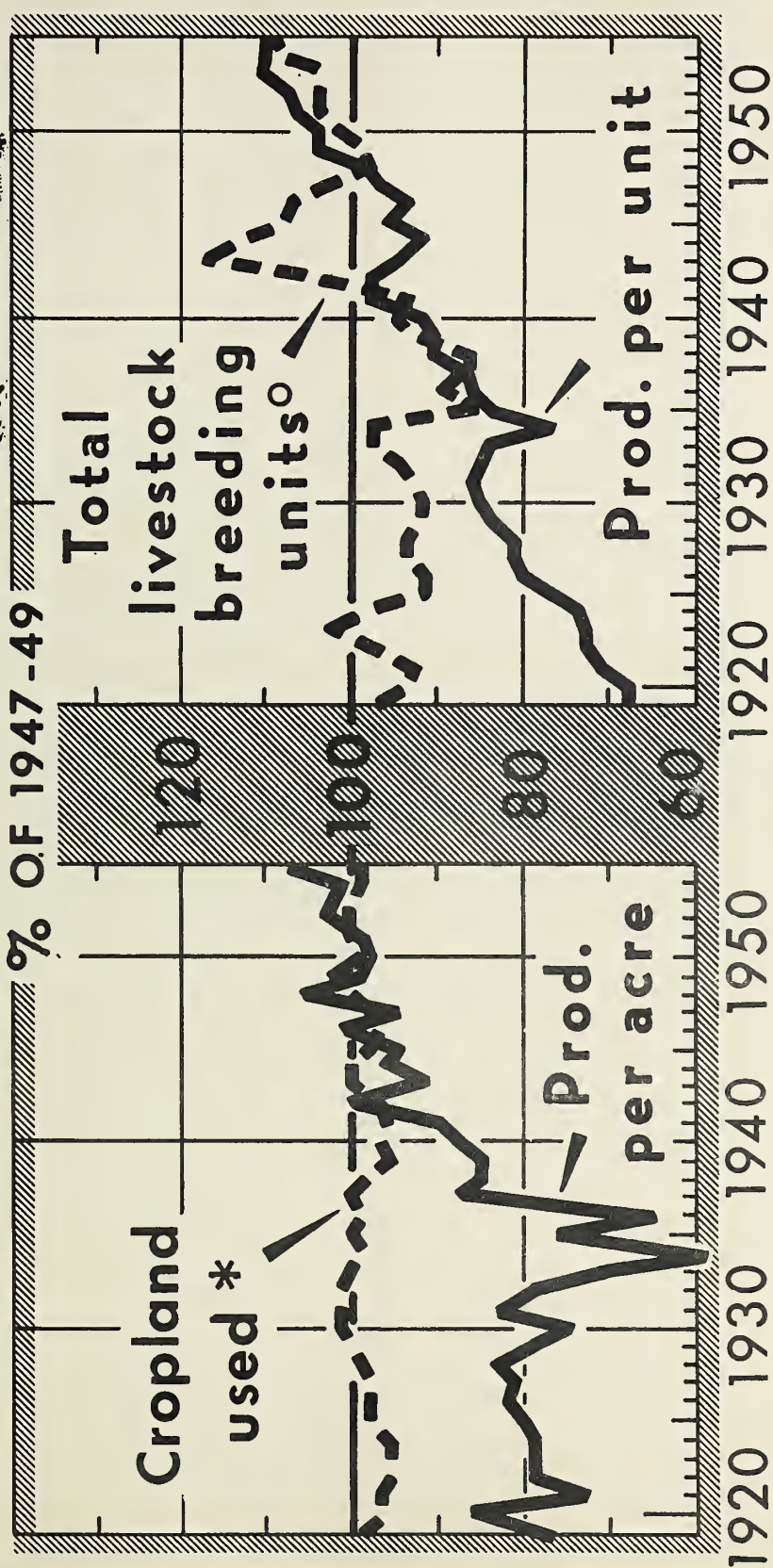
1. Record farm output in 1955. A record livestock production combined with crop production matching the record outturn of 1948 promises an all-time high farm output in 1955. Farm output will be about 4 percent greater than the previous highs of 1953 and 1954, and 12 percent greater than the 1947-49 average.

Crop production per acre of cropland used in 1955 was 7 percent above 1947-49 and will exceed the record set in 1948. (See Fig. 1). An important factor in the 6 percent increase in crop production per acre from 1954 to 1955 has been improved weather conditions.

The number of breeding units of livestock increased slightly in 1955. Production per unit equals the record high set in 1953.

2. Net farm incomes reduced in 1954. Although net farm income in the United States was lower in 1954 than in 1953, the income situation varied widely among types of farms. Thirteen of 21 types of commercial, family-operated farms for which data have been developed had lower net incomes in 1954 than in 1953. On 2 types of farms there was little change and on 6 types of farms net incomes in 1954 were higher. Spring-wheat farms, livestock farms, dairy farms, and cotton farms (except those in the High Plains) all had lower incomes in 1954 than in 1953 (Table 1). Net farm incomes in 1954 were below the 1947-49 average on 16 of the 21 types of farms studied (Fig. 2). On 4 types of farms net incomes in both 1953 and 1954 were above the 1947-49 average. These were the hog-dairy farms in the Corn Belt, tobacco-livestock farms in Kentucky, tobacco-cotton farms in North Carolina, and wheat-pea farms in the Pacific Northwest.

FARM PRODUCTION PER ACRE AND PER ANIMAL



* ESTIMATED ACREAGE FROM WHICH ONE OR MORE CROPS WERE HARVESTED

PLUS ACREAGE OF CROP FAILURE AND SUMMER FALLOW

° INCLUDES ALL BREEDING LIVESTOCK EXCEPT HORSES, AND ALL LIVESTOCK PRODUCTION EXCEPT FARM-PRODUCED POWER OF HORSES AND MULES

TABLE I

Net farm income, commercial family-operated farms by
type and location, 1954 with comparisons

Type of farm and location	Average		1951	1952	1953	1954
	1927-41	1947-49				
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Dairy farms:						
Central Northeast	960	3,892	4,475	3,956	3,493	3,327
Eastern Wisconsin	1,469	4,365	4,929	4,535	3,760	3,321
Western Wisconsin	1,236	3,284	4,029	3,825	3,159	2,494
Corn Belt farms:						
Hog-dairy	1,612	5,639	6,477	6,211	5,998	6,179
Hog-beef raising	928	3,370	4,374	4,457	3,357	2,907
Hog-beef fattening	2,520	10,665	10,871	8,737	7,055	8,849
Cash grain	2,627	8,930	10,233	9,248	7,471	8,566
Tobacco farms:						
Tobacco-livestock (Ky.)	1,192	3,334	3,883	3,976	3,457	3,439
Tobacco-cotton (N.C.)	1/	3,203	4,678	3,238	3,240	3,319
Cotton farms:						
Southern Piedmont	495	1,565	1,982	1,596	1,340	994
Delta of Mississippi	1,024	2,839	2,565	3,076	2,922	2,448
Black Prairie, Texas	1,045	3,118	2,192	3,067	3,695	2,067
High Plains, Tex. (Non-irrigated)	1,675	6,411	7,009	2,410	-180	4,333
High Plains, Tex. (Irrigated)	1/	10,761	14,513	13,119	9,730	13,247
Spring wheat farms (No. Plains):						
Wheat-corn-livestock	1,127	5,972	7,176	2,732	4,302	3,703
Wheat-small grain-livestock	872	6,323	7,135	3,702	4,075	2,560
Wheat-roughage-livestock	533	5,370	5,491	2,355	4,755	3,057
Winter wheat farms:						
Wheat-pea (Wash.&Idaho)	2,764	11,864	10,716	14,210	14,705	14,900
Sheep ranches:						
Northern Plains	2,734	6,908	19,337	5,890	5,287	4,299
Cattle ranches:						
Northern Plains	930	6,466	9,791	5,942	4,216	3,625
Intermountain Region	2,892	8,665	14,457	10,934	4,833	4,543

1/ Data not available.

1954 Compared With 1947-49

NET FARM INCOME PER FARM

TYPE OF FARM

% CHANGE

-60 -30 0 +30 +60



WHEAT-PEA, WASHINGTON-IDAHO

COTTON, HIGH PLAINS TEXAS*

HOG-DAIRY, CORN BELT

TOBACCO-LIVESTOCK, KY.

TOBACCO-COTTON, N. CAROLINA

CASH GRAIN, CORN BELT

ALL FARMS, UNITED STATES

HOG-BEEF RAISING, CORN BELT

COTTON, DELTA OF MISSISSIPPI

DAIRY, CENTRAL NORTHEAST

HOG-BEEF FATTENING, CORN BELT

DAIRY, EASTERN WISCONSIN

DAIRY, WESTERN WISCONSIN

COTTON, HIGH PLAINS, TEXAS°

COTTON, BLACK PRAIRIE, TEXAS

COTTON, SOUTHERN PIEDMONT

WHEAT-CORN-LIVESTOCK, N. PLAINS

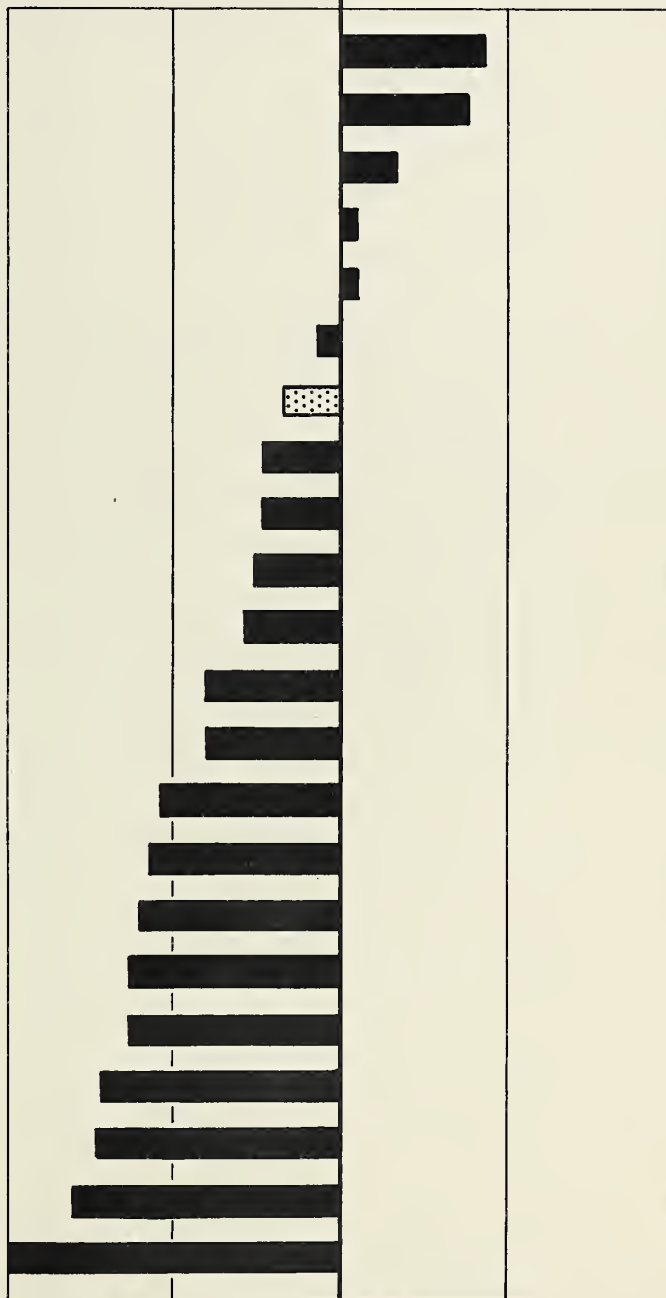
SHEEP RANCHES, N. PLAINS

WHEAT-ROUGHAGE-LIVESTOCK, N. PLAINS ..

CATTLE RANCHES, N. PLAINS

CATTLE RANCHES, INTERMOUNTAIN

WHEAT-SMALL GRAIN-LIVESTOCK, N. PLAINS



* IRRIGATED

° NON-IRRIGATED

Figure 2

The widespread net income decline was due primarily to economic forces beyond the control of farmers. Farmers' economic efficiency--output compared with input--has increased on most types of farms during the last 20 years (Fig. 3). Particularly striking are the marked increases in efficiency for most crop farms.

3. Farm real estate values increase. Farm real estate values increased 5 percent during the year ended July 1, 1955. Largest increases during the year occurred in the central Corn Belt and in Texas, Louisiana and Florida (Fig. 4). The national index of average value per acre advanced to 129 (1947-49 = 100), the same as the previous peak that was reached in July and November 1952 following the Korean outbreak. Thus, all the 6-percent decline that had occurred between July 1952 and November 1953 was recovered. Values reached new peak levels in 17 States and were within 2 percent of their recent peaks in 5 additional States.

The strength shown in land values during the past 18 months, despite the downturn in farm commodity prices and incomes (Fig. 5), appears to be based in part on strong demand for additional land to enlarge existing farms. Increased availability of credit also was a factor in many Corn Belt States and in better farming areas elsewhere. In addition, favorable crop prospects as of mid-1955 and the buoyancy in the general economy appear to have strengthened both the demand for, and the prices of, farmland.

More than two-thirds of the farms and tracts sold in 1954-55 were bought by farmers, a slightly higher proportion than a year earlier. About a third of all farms and tracts sold in 1954-55 were bought for farm enlargement, and nearly half of such purchases were operated as single farms before they were sold. Possibly 50,000 farms were absorbed by the farm-enlargement process in 1954.

4. Farm-mortgage and short-term debt increases. Total farm-mortgage debt increased in 1954 for the ninth consecutive year, and on January 1, 1955, it totaled \$8.2 billion, 7 percent above the previous year (Fig. 6). This is the highest figure since January 1, 1933, and is 72 percent above the postwar low in 1946. Farm-mortgage debt continued to rise in 1955 and at the end of the year is estimated to total about \$9 billion.

Non-real-estate farm debt (excluding price-support loans) also moved upward to \$7.3 billion on January 1, 1955. This was 5 percent above a year earlier and about $2\frac{1}{2}$ times as large as at the beginning of 1946.

5. Value of farm assets remains stable. Estimates for the annual "Balance Sheet of Agriculture" show that the total value of farm assets at the beginning of 1955 was about \$163 billion, 1 percent above a year earlier but about 4 percent below the peak of 1952. These assets include physical properties--farms, livestock, machinery, motor vehicles, and crop inventories--and also household goods, bank deposits, and other financial assets owned by farmers. Total farm debts, including price-support loans of the Commodity Credit Corporation, rose nearly a billion

dollars in 1954, from \$17.1 billion to \$18.0 billion. The equities of farmers and other owners of farm property increased slightly--less than 1 percent--in 1954.

6. Farm taxes continue to rise. The annual survey of 1954 tax levies on farm real estate, payable largely in 1955, shows the average taxes per acre to be nearly 5 percent higher than a year earlier (Fig.7). This is the 12th consecutive year of increase. The increase pushes the average tax per acre to an all-time high. Compared with the base period (1909-13 = 100), the index for 1954 is 409.

In 1954 taxes levied on farm real estate and personal property were \$906 million and \$224 million, respectively, and totaled \$1,130 million dollars.

Farm personal property taxes levied in 1954, payable largely in 1955, will be about 3 percent lower than a year earlier--the second decrease since 1933. The decline is due mainly to a decrease in livestock assessments. Personal property taxes comprise about 20 percent of the total property taxes levied on farmers, and will be about four and one-quarter times as large as in 1940.

7. Farm fire losses mount. United States farm fire losses have continued to mount--from \$136 million in 1952 to \$139 million in 1953, and to \$157 million in 1954.

Based on the experience of sample farm mutual fire insurance companies, losses paid in 1954 averaged 16.4 cents per \$100 of insurance, compared with 14.8 cents in 1953. Operating expenses, however, averaged 7.5 cents per \$100 in 1954, compared with 7.8 cents in 1953. These companies increased their insurance in force about 6 percent during 1954, while their safety funds increased about 5 percent.

8. Production job ahead calls for greater farm output. Recently developed projections of requirements for farm products in 1975 indicate a needed farm output about one-third greater than in 1951-53.

Total crop production in 1975 would have to be about one-fourth larger than in 1951-53. Production of livestock and livestock products would be around 45 percent above 1951-53.

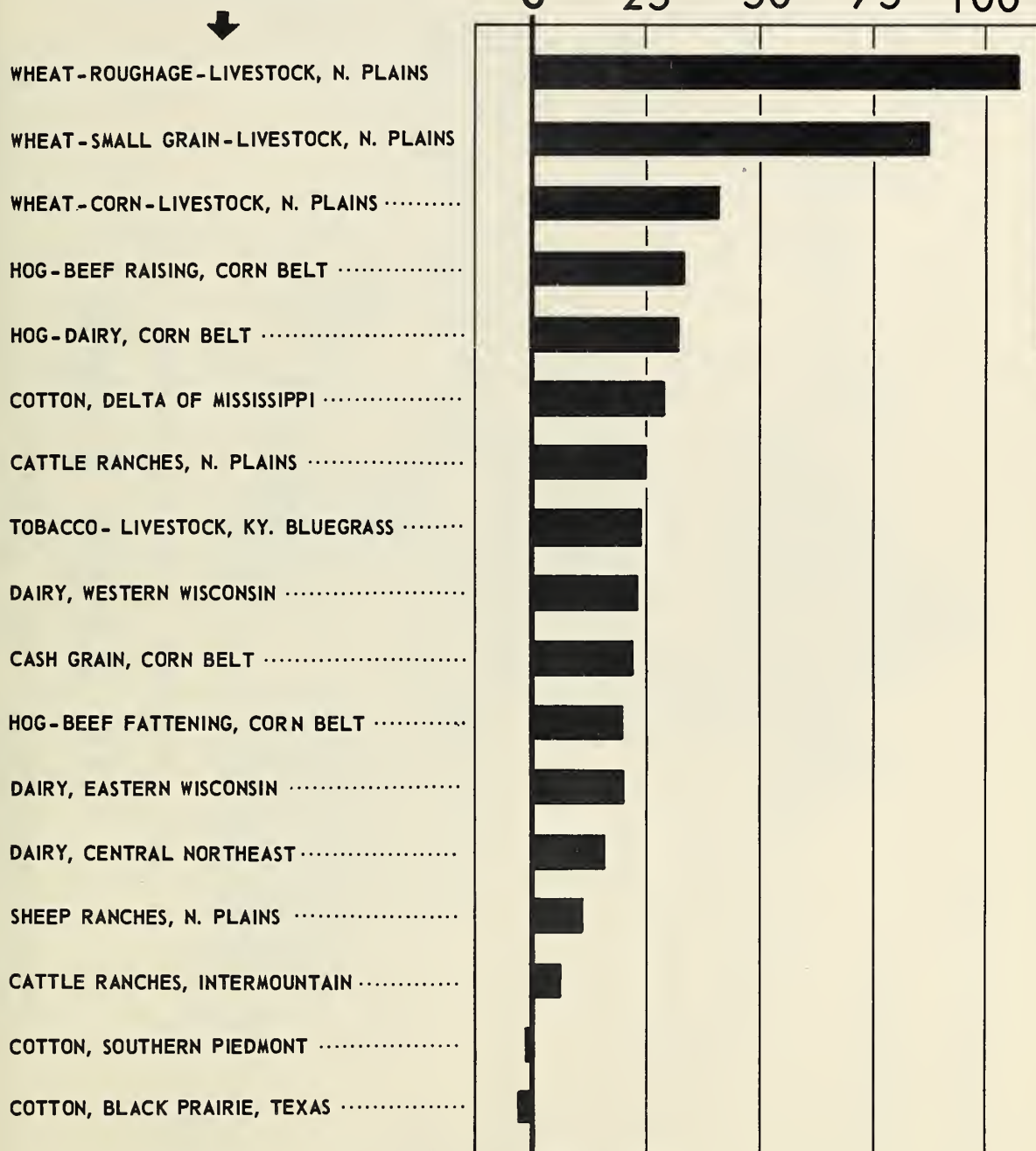
The greatest increase needed in crop production would be in the feed crops--feed grains, hay, pasture, and soybeans (our chief source of protein feed). Crops where little or no production increase is likely to be needed include the major food grains. Potatoes and cotton are examples of crops whose production might need to be increased less percentage-wise than the projected increase in population (about one-third).

1950-54 Compared With 1930-39

PRODUCTION PER UNIT OF INPUT*

TYPE OF FARM

% CHANGE

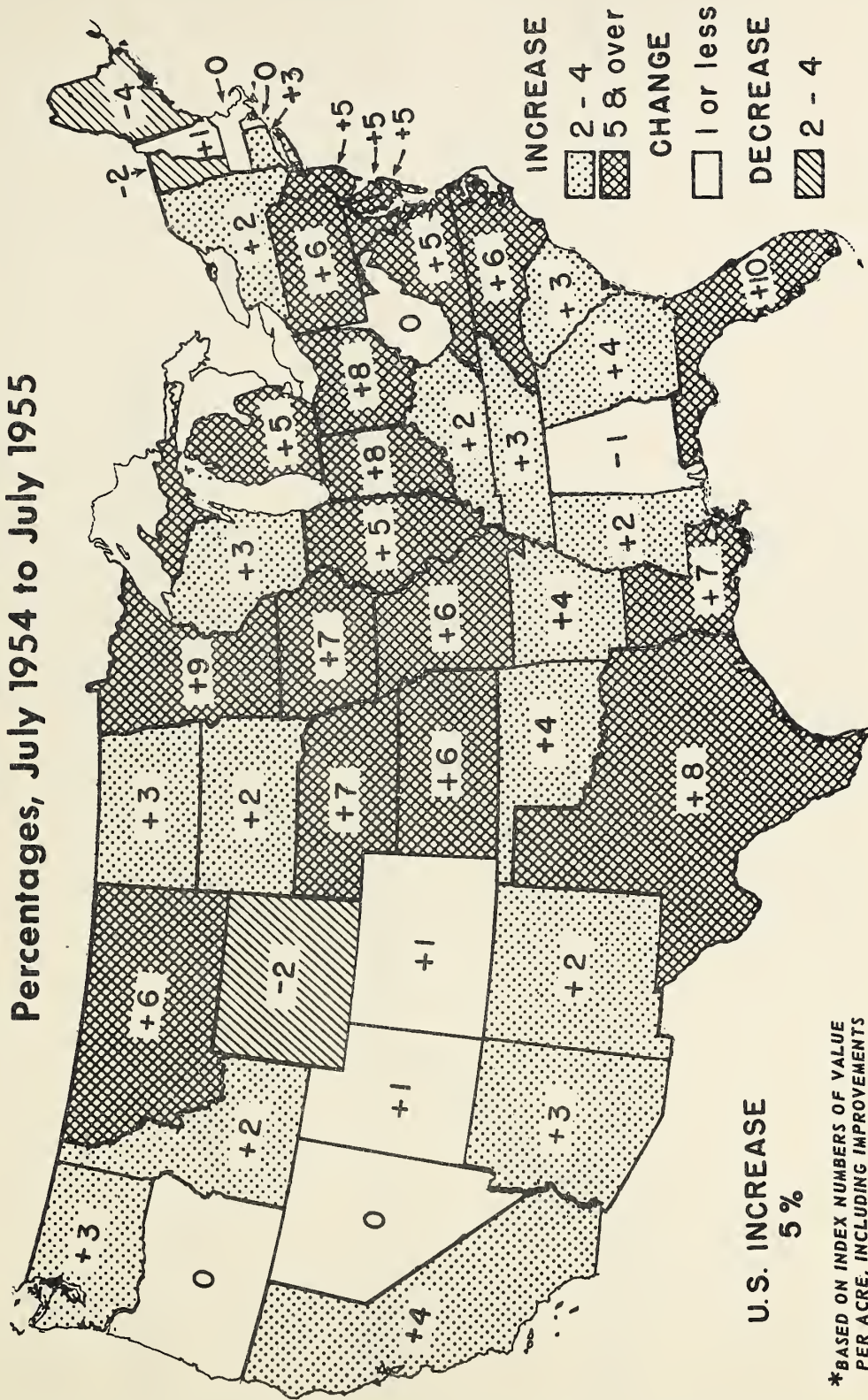


*COMMERCIAL FAMILY-OPERATED FARMS

Figure 3

CHANGES IN DOLLAR VALUE OF FARM LAND*

Percentages, July 1954 to July 1955



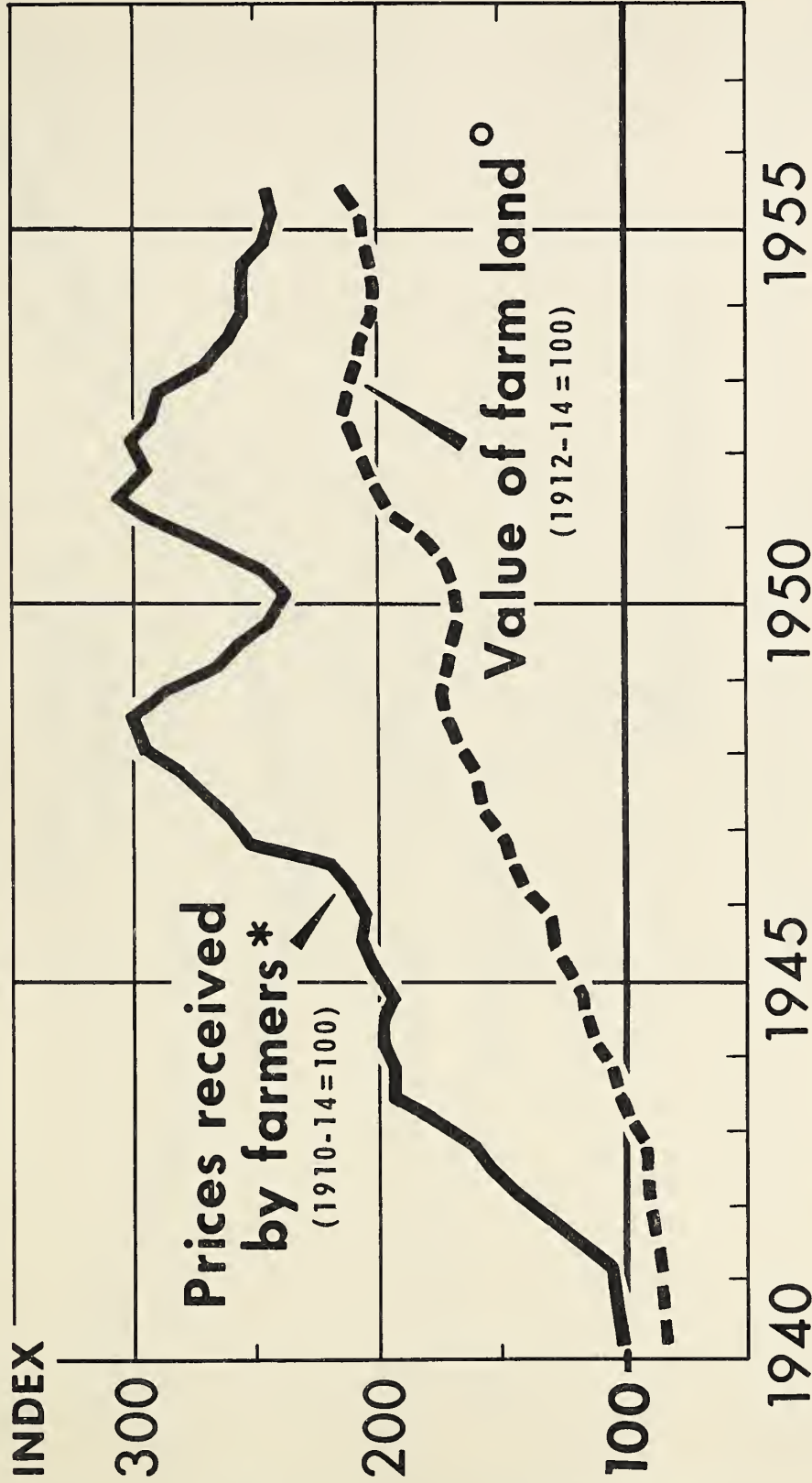
*BASED ON INDEX NUMBERS OF VALUE PER ACRE, INCLUDING IMPROVEMENTS

U. S. DEPARTMENT OF AGRICULTURE

NEG. 55(8)-742 AGRICULTURAL RESEARCH SERVICE

Figure 4

LAND VALUES LAG BEHIND COMMODITY PRICES

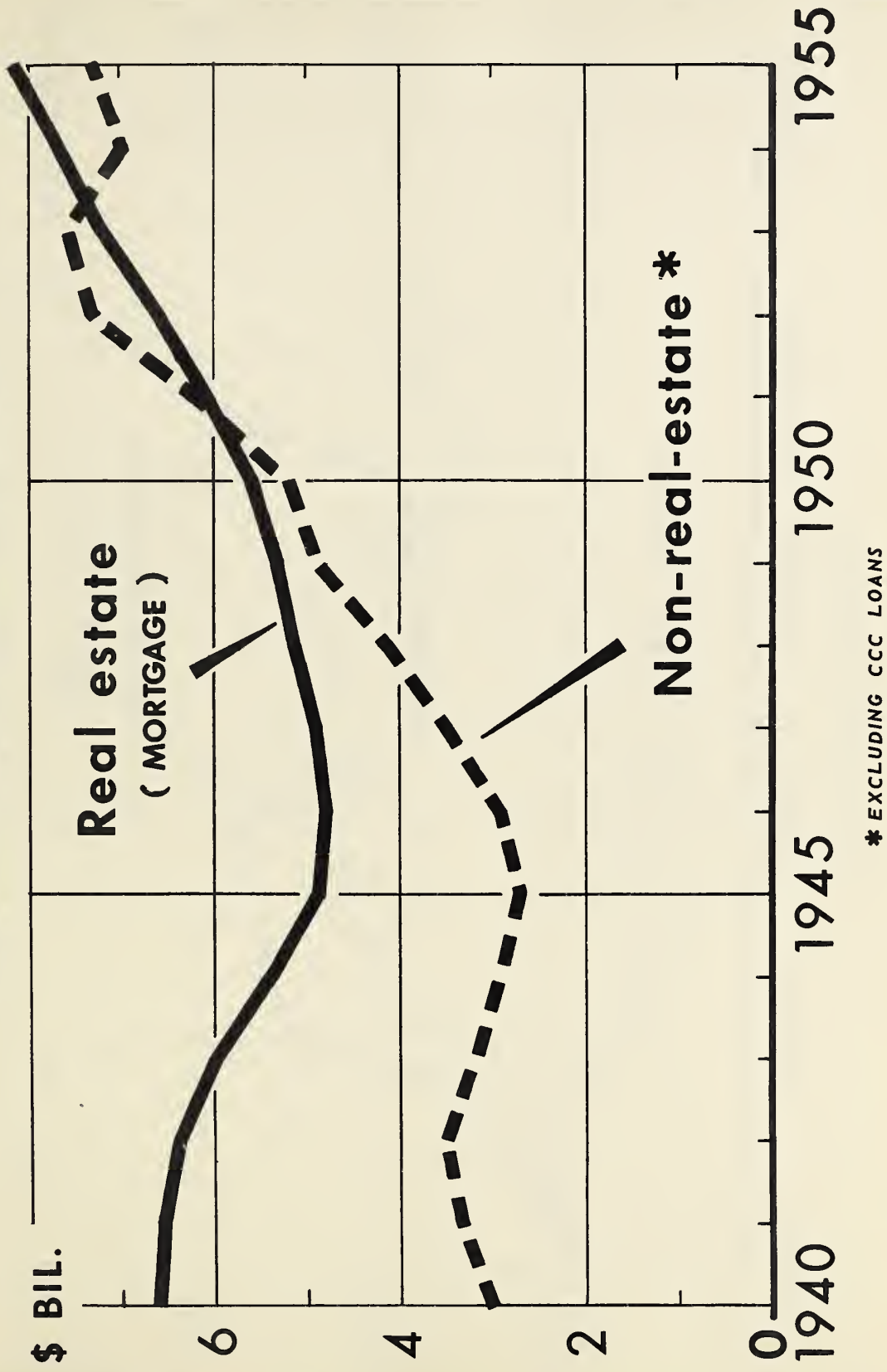


* AVERAGE OF FOUR PREVIOUS MONTHLY INDEXES

° DATA FOR 1940 & '41 AS OF MARCH 1; 1942 TO DATE AS OF MAR. 1, JULY 1 AND NOV. 1

Figure 5

TOTAL FARM DEBT



FARM REAL ESTATE TAXES

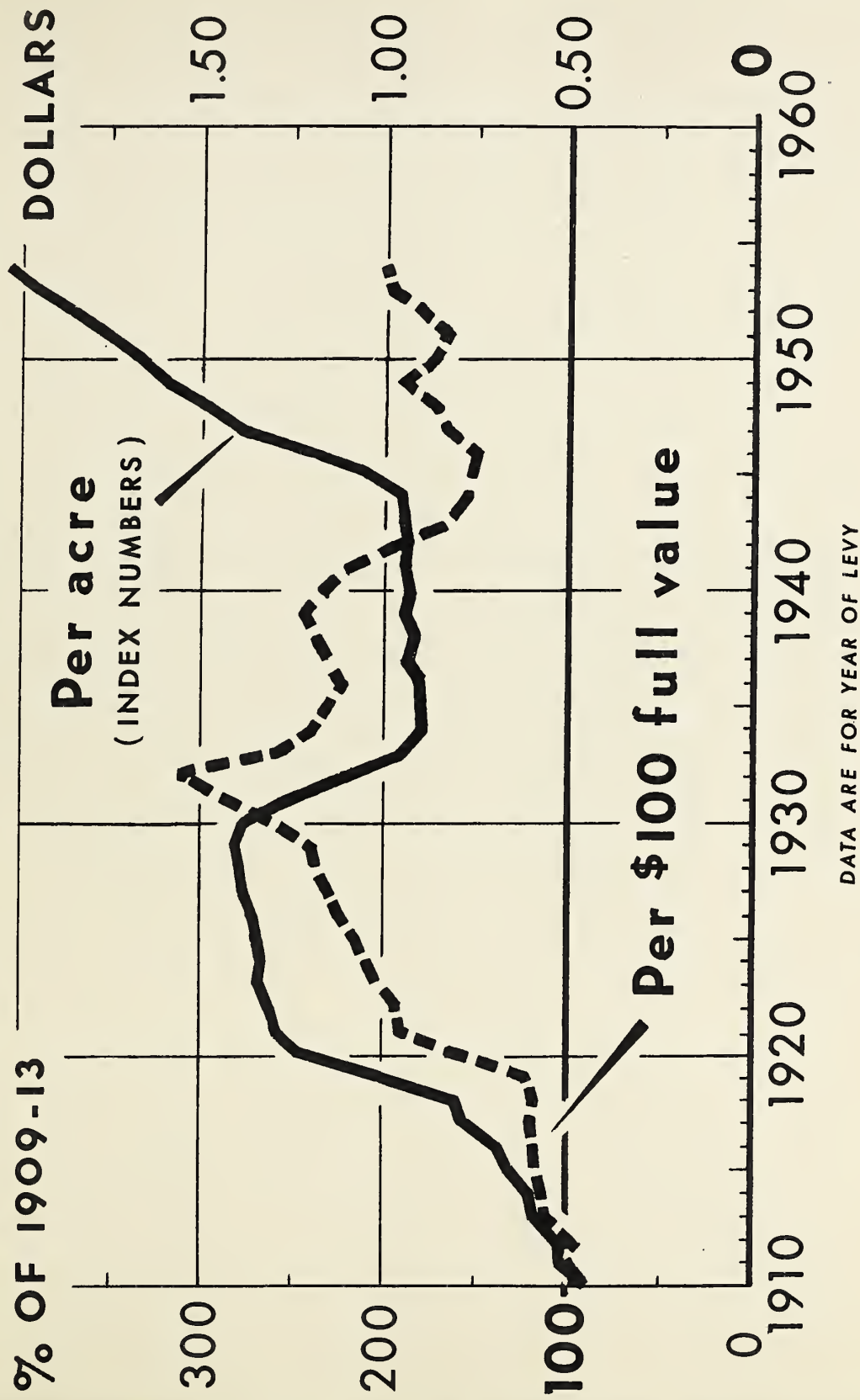


Figure 7

Release of cropland because of further decrease in the number of horses and mules will be unimportant in the future. This means that increased production by 1975 will depend chiefly on greater per-acre yields and on changes in cropland area and shifts in land use.

9. Sixty million acres sprayed or dusted. Estimates developed in a recent study show that in 1952 about 60 million acres, or one-sixth of the total harvested acreage of principal crops, were sprayed or dusted one or more times for the control of insects, diseases, weeds, and brush. The total cost of this work, including only the cost of materials applied by the farmer and the total amount paid custom operators for materials and their application, was \$256 million. Cotton was the most extensively treated crop for control of insects. More than 12 million acres were treated at a cost of \$64 million. About 3.5 million acres of tree fruits, nuts, and small fruits were treated at a cost to the farmer of \$63 million. For spraying and dusting on livestock, and in barns and shelters, farmers spent about \$15 million in 1952. Since 1940 the use of chemicals for controlling weeds and brush has been increasing rapidly. In 1952 more than 31 million acres of crops and land were treated for control of weeds and brush at a cost of \$48 million.
10. Farm credit demands increase in a Southern Great Plains drought area. A study made in two counties of Oklahoma shows that during the last few years of drought the demand for credit has increased and purchases of livestock, farm machinery, and automobiles have been curtailed sharply. Local banks and the production credit association are in excellent financial condition, and are carrying over old balances on farm loans, but new loans are being made only when fully secured. Because of the decline in the value of their chattels, farmers and ranchers find it increasingly difficult to meet the security requirements needed to obtain loans from these lenders. Therefore, a strong demand exists on the part of farmers, banks, and merchants for the FHA emergency loan program. Without this program many farmers would have been forced to quit or at least curtail operations. About 300 of the 1,900 farmers in the 2-county area received emergency loans from mid-1951 to September 1954. Outstanding credit on the books of business firms dealing with farmers has also increased--six farm machinery and automobile dealers had three times the credit outstanding in 1954 as in 1950.
11. Sheep raising can help improve incomes on irrigated farms. A study of sheep raising on irrigated farms in Montana showed that a flock of 60 ewes would return about \$640 to pasture, labor, and management. This flock would require about 15 acres of good irrigated pasture. The extent to which ditch banks and other waste land is used for pasture affects the net return from the flock. Fencing was found to be a major item of expense. Buildings originally built for other purposes often are used for sheep. Sheep were found to fit in well with other enterprises in the farming system. Labor requirements were high only during lambing, which occurred before crop work began. Results of this study are highly significant in view of the general need for profitable livestock enterprises on small irrigated farms in the west and in view of the national policy of encouraging domestic wool production.

12. Farming adjustments in southeastern Ohio can increase income. About 65 percent of all farmers in a 7-county Ohio area studied had incomes from the sale of farm products which were less than \$1,000 in 1949. Many were supplementing their farm incomes with wages from off-farm employment. Farmers devoting full time to small farms netted only about \$300 a year more from the farm than other operators of small farms, who worked 100 days or more off the farm. The part-time farmers had a combined farm and nonfarm income which was about \$3,000 more than the full-time farmers. But many farmers are not taking full advantage of their opportunities for improving incomes from farming. On a typical 120-acre farm, the acreage of cropland can be increased 50 percent by contour-strip cropping. By liming, fertilizing, and clipping permanent pastures, their livestock carrying capacity can be increased with only half as much pasture as is now used. This, together with better livestock breeding and feeding practices, would increase net farm income by nearly \$3,000 (at 1952 prices) with only 400 more hours of labor per year.
13. Farm electrification is expanding. A study of electrified farms in New York and New England shows that farmers are rapidly installing electrical equipment to make farming more efficient and the farm home more comfortable. In 1951, average consumption of electricity per farm was 5,057 kilowatt-hours, or 3 times the average of 10 years earlier. The average rate of increase during that decade was 13.3 percent a year. If this rate of increase were continued to 1960, average consumption per farm then would be 16,000 kilowatt-hours (Fig. 8).

Both dairy and poultry farms used more electricity, as a rule, than did those of other types studied; noncommercial farms used less than commercial farms. Household operations required about two-thirds of all the electricity used on the 1,115 farms in 1951 and farm operations about one-third. On dairy and poultry farms, however, farm operations required almost as much electricity as did household operations.

14. More labor used for livestock than for any other farm enterprise. In 1951 the care of milk cows took more than twice as much farm labor as any other farm enterprise. About 40 percent of all farm work was devoted to care of livestock and their products. More labor is used on milk cows in relation to value of product than on other livestock. In 1950, 62 man-hours were used per \$100 of milk produced (Fig. 9). Size of herd and use of milking machines are important factors affecting man-hours per cow.

Despite relatively large numbers of sheep per ranch, labor requirements for these animals are highest in range areas, chiefly because of time involved in herding them. In 1950, 27 man-hours of labor were used per \$100 of wool and liveweight production of sheep and lambs. Labor-wise, broilers are the most efficient of all livestock enterprises, with an average of 12 man-hours used per \$100 of production.

AV. ANNUAL KWH CONSUMPTION AND PROJECTIONS TO 1961

*Per Farm, Electrified Farms in New York
and New England, 1942-51*

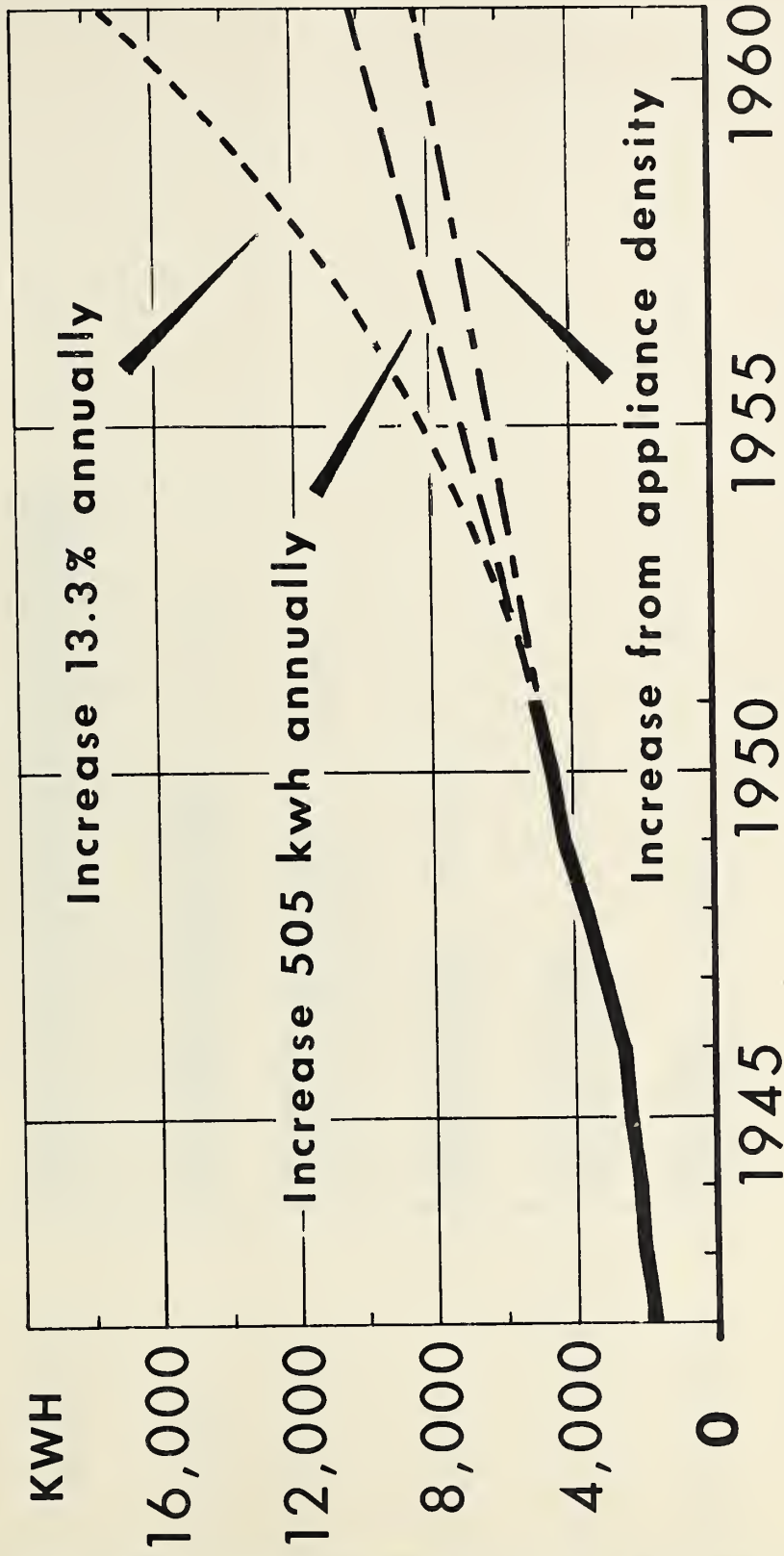


Figure 8

LABOR

Per \$100 of Production, 1950

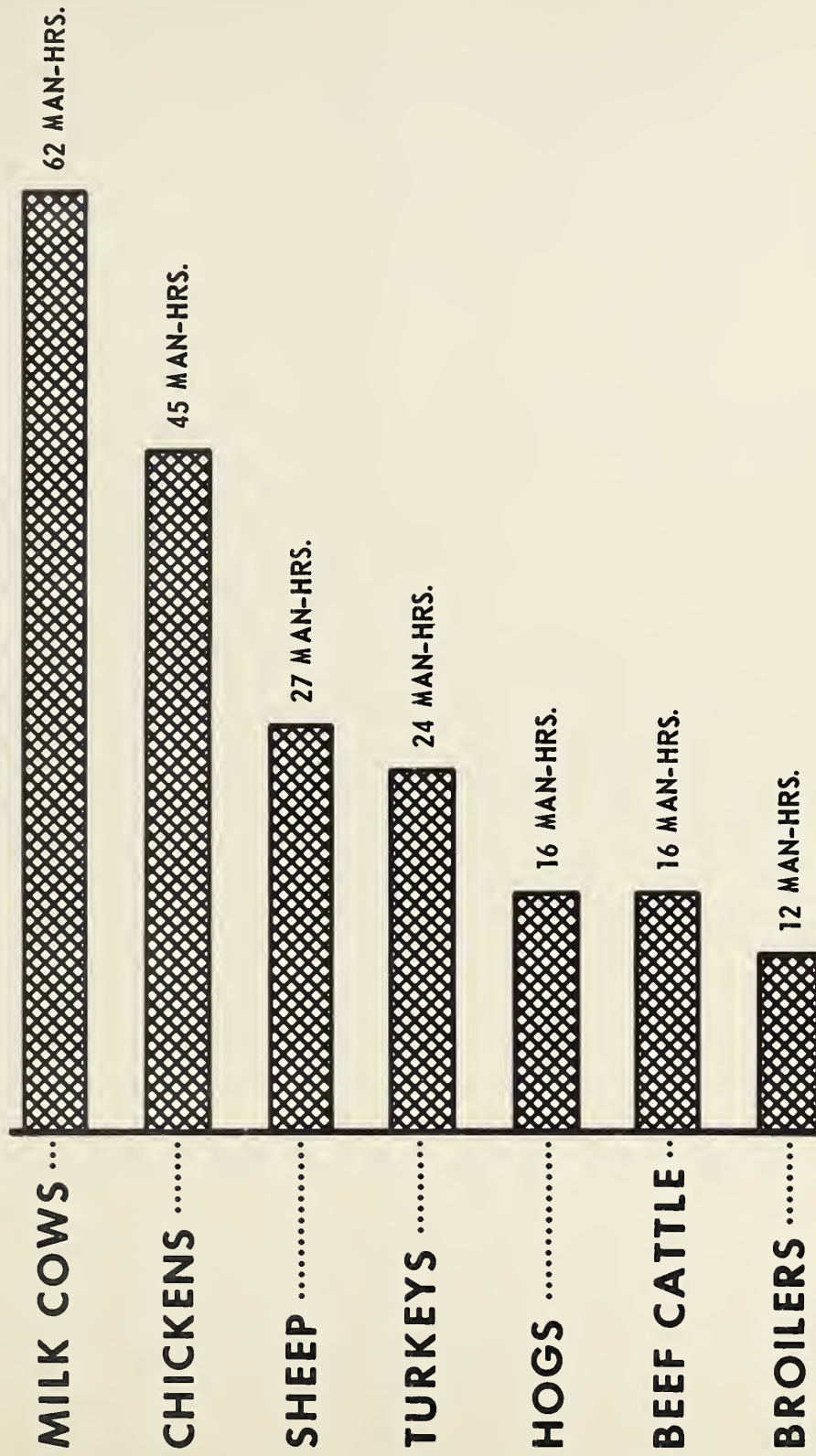


Figure 9

15. Competitive position of American-Egyptian cotton improved in the agriculture of the Southwest. A study of the major producing areas indicates that the competitive position of American-Egyptian cotton has been improved with the introduction of a new variety, Pima S-1. In 1954, yields of Pima S-1 ranged from 64 to 78 percent of the yields of upland varieties. There was essentially no difference in cultural practices and in costs of growing the two kinds of cotton up to harvest. But picking and ginning costs for Pima S-1 were nearly twice those for upland varieties. However, the net returns on most farms in 1954 were considerably higher from Pima S-1 than from upland varieties. With the present level of technology, net incomes per acre would be about equal from the two kinds of cotton when the yield of Pima S-1 is 65 to 70 percent of upland yields and the average price of Pima S-1 is about 1.6 to 1.8 times that for upland.
16. Dealers assume most of the risks in broiler financing. In a study of broiler financing in several Southern States, in cooperation with the Southern Regional Poultry Marketing Committee, it was found that more than 90 percent of the broiler growers in each State were furnished with chicks, feed, and other supplies by dealers. In about two-thirds of such arrangements, dealers shared or assumed most of the risks of loss. As the risks assumed by the dealers increased, they took over more and more managerial functions.

Means of reducing risks--chiefly price and mortality risks--appear to offer the best possibility of a return to more conventional financing, in which growers would have more control over their operations. Needed are improvements in production methods and disease treatment to find means of reducing mortality risks. Improved data on chick placements, improved market news reports, and improved measures of demand are also required, so that production may be geared more closely to demand and thus reduce risks of price fluctuation. Under present methods of financing, the most promising means of accomplishing improvements are for dealers to provide growers with greater incentives for efficient production and to tighten up somewhat on requirements for financing under grower contracts.

17. Survey made of value of raising vs. buying dairy herd replacements. A survey of 229 dairy farms in New Hampshire showed that 36 percent of the dairymen raised all of the replacements in their dairy herds, which means that many New England dairymen use forage, barn space, and labor for raising replacements which could be used for carrying additional milk cows. Furthermore, and contrary to a general belief, the study indicates that (1) purchased and raised cows in New Hampshire dairy herds produce about the same quantity of milk and are comparable in terms of quality, (2) purchased cows have a longer productive life than raised cows--7.1 years compared with 5.7 years at age of disposal--and (3) purchased cows are no more prone to disease than raised cows. Farmers who had only raised cows removed 41 percent of their cows because of udder trouble, sterility, and brucellosis, whereas those who had purchased animals lost only 37 percent of their cows for these reasons. On the basis of these findings, each dairy farmer should appraise his particular replacement program. A concise budget form has been developed which he can use to analyze the productive resources on his farm and

test the effect on his income of alternative changes in numbers of replacements and dairy cows in his herd.

18. Farm rents adjust slowly to changes in prices and costs. A cooperative study with the Iowa Agricultural Experiment Station indicates that farm rents adjust slowly to changes in economic conditions. When prices and costs are increasing, the landlord renting for shares gets a larger share of the farm net return. Conversely, the landlord's share of the net return declines when prices and costs decline. Under cash-rental arrangements the landlord's share of the farm net return decreases when prices are rising, but increases as prices decline (Fig. 10). In periods of severe price declines the landlord's net return with fixed cash rental exceeded the total net return of the farm.

Landlords and tenants have tried many devices to compensate for rigid rental arrangements including changes in lease provisions, changes in kind of leases, and changes in rental partners. Changes in lease provisions generally have not been successful and renters have adjusted mainly by changing farms, with the consequent cost of disruption of farm operations, increased soil erosion, restricted livestock programs, and disruption of community ties.

Various methods for introducing flexibility into leasing and to prevent the losses caused by tenant movements were analyzed. Some new techniques have been developed which show promise of overcoming weaknesses of prevailing methods.

19. Study of law of water rights in the West proves helpful. Results from a study being conducted in cooperation with the General Counsel's Office, covering the historical development and current status of the law of water rights in the 17 Western States, are being used extensively by public and private agencies and individuals in the consideration of water-right problems of crucial importance to farmers and others. A bulletin has been prepared for California farmers which describes irrigation water rights in that State and indicates alternatives available under the applicable laws in acquiring rights to water from different sources, including surface streams, lakes or ponds, diffused surface waters, and percolating underground waters or underground streams. Similar reports are nearing completion for 8 other Western States. The main advantages and weaknesses of the prior appropriation, the riparian, and other legal doctrines are being analyzed, together with constitutional questions encountered in changing certain water-right laws. Results of this research will be helpful to those concerned with similar issues in the Eastern States where problems of water rights are becoming increasingly important.
20. Scheduling of workers improves use of migrant labor. During World War II producers of vegetables, fruits, and potatoes along the Atlantic Coast engaged in sharp competition for the use of migratory workers, resulting in wasteful movement and loss of time. Since 1944, the Federal and State Employment Services have operated a program to schedule the movements of these workers to employers from the time they leave Florida in the spring until they return in the fall. This program has benefited both growers and workers. A recent study shows how fully the workers in this system of scheduled migration were employed in 1953. Male heads of households worked an average of 214 days and had average earnings of \$1,169. Fewer days of employment for the women and children brought average employment for all workers down to 182 days and average earnings to \$908. Approximately half worked in only one State outside Florida, 30 percent more worked only in two States.

For Iowa Farms

LANDLORD'S SHARE OF NET RETURNS

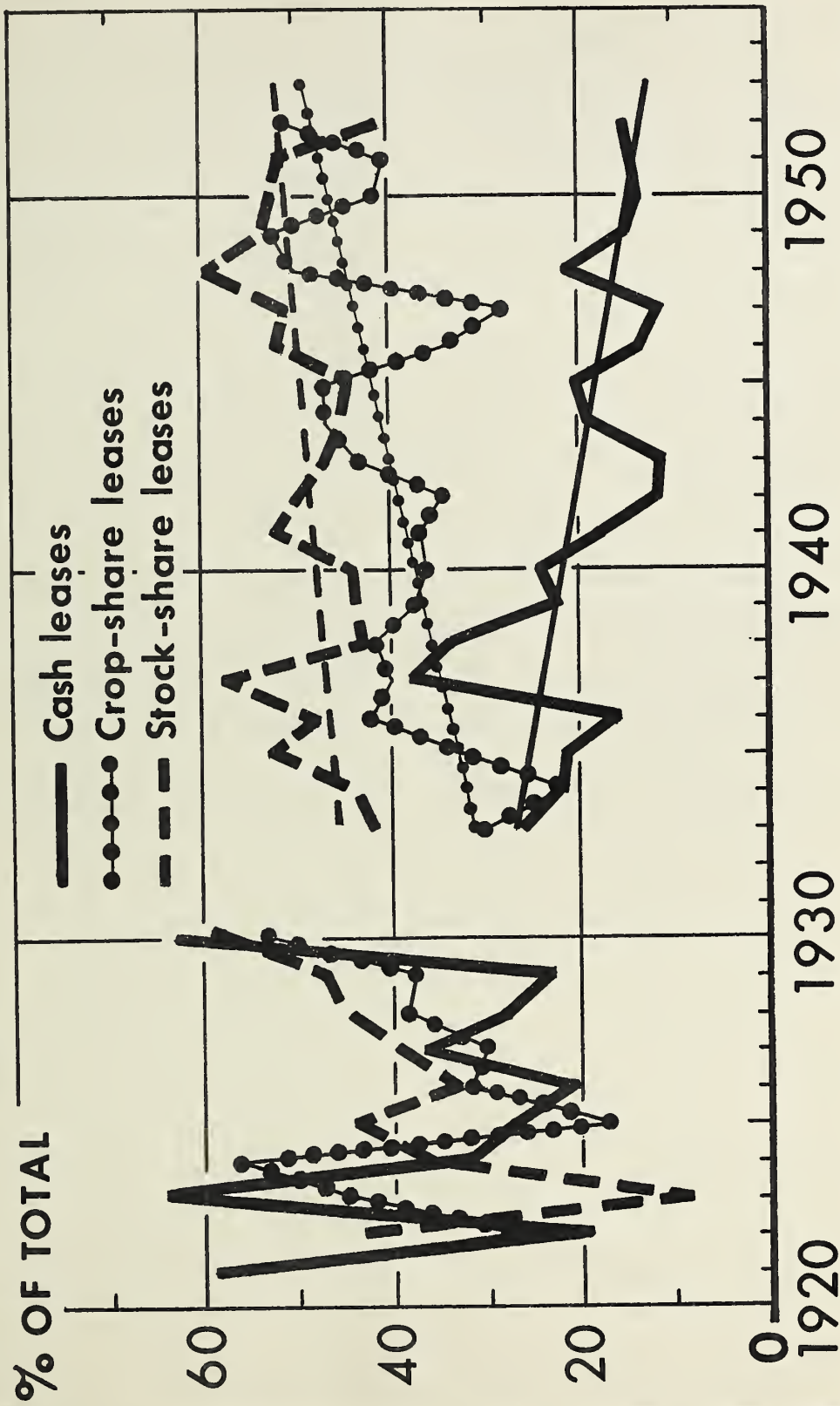


Figure 10

LIVESTOCK RESEARCH

Current activities: Investigations are conducted on all farm livestock, poultry, and domestic fur animals to develop superior strains and types, establish nutritive requirements, determine physiology of reproduction, achieve efficient use of feed and forage in the production of meat, milk, eggs, wool, fur, and other products, develop practical methods of control of diseases and of parasites affecting livestock, and develop improved and efficient dairy management methods and practices.

Selected Examples of Recent Progress:

Animal and Poultry Husbandry Research:

1. Live-hog backfat probing indicates carcass value. The method of live-hog backfat probing developed at the Iowa Agricultural Experiment Station was applied to 140 pigs at Beltsville at 150, 175, 200 and 225 pounds live weight. The live-hog measurements at each of these weights were significantly correlated with the percentage of preferred cuts when the pigs were slaughtered at 225 pounds. The probe method can, therefore, be used in the selection of meat-type breeding stock.
2. Crossbred gilts raise more pigs per litter. Gilts from crosses among purebred Chester White, Berkshire, Hampshire, Poland China and six Beltsville lines weaned about 10 percent more pigs per litter than gilts of the several pure breeds and lines used. Litter weight at weaning was about 25 percent greater for the litters from the crossbred gilts than for litters from the gilts of the pure breeds and lines used.
3. Antibiotic-B12 feed supplements produce no increase in fatness. Antibiotic-B12 supplement fed pigs at Beltsville grew faster to weaning than their controls, which received the same feed and care except for the omission of the antibiotic-B12 supplement and gained equally fast from weaning to 215 pounds live weight. Experimental animals were not fatter than the controls, a most important finding, since many research workers and farmers fear that increasing rate of gain with such supplements will result in over-fat market pigs.
4. Meat-type hogs are found in all breeds. Research in cooperation with the breeders and State Experiment Stations in Illinois, Wisconsin, Indiana, Ohio, and Pennsylvania, with Chester White, Duroc, Poland China, Yorkshire, Berkshire, and Hampshire breeds has identified meat-type boars, gilts, and litters in herds of each of these breeds. Selected propagation of meat-type stock in all breeds will rapidly improve the carcass quality of market pigs.
5. Inorganic factor in feathers promotes chick growth. Studies with feather meal at Beltsville have indicated that it can effectively replace fish meal, presently selling at about 10 times the price of waste feathers, in a corn-and soybean-meal diet containing 20 percent protein. Preliminary studies indicate that much, perhaps all, of the growth-promoting effect of the feather meal is present in the ash of feather meal and is, therefore, inorganic in nature.

6. Selective breeding of non-inbred Rambouillets substantially improved economic traits in 5 years. Selective breeding in a non-inbred flock of Rambouillet sheep at the Dubois, Idaho, station produced 18.5 percent improvement in restricting wool growth on the face, 15.5 percent longer staple of wool, 7.2 percent increase in weaning weight of lambs, and 17.6 percent improvement in overall merit during the 5-year period (1949 to 1954).
7. Lignin content of grass silage affects feeding value. As grasses mature, lignin content increases, and consequently digestibility of all contained nutrients decreases. Silage made from immature grass is therefore generally superior in nutritive value, not only because immature grass is higher in nutrient content than mature grass, but also because it is more digestible even after being ensiled. Wintering steers receiving low-lignin grass silage as the sole roughage make gains approximately equal to steers receiving corn silage.
8. Bulls from performance-tested lines sire faster gaining steers. Research in cooperation with the Ohio and Montana Agricultural Experiment Stations, conducted in Ohio, shows that steers sired by Line I Hereford bulls from the U. S. Range Livestock Experiment Station, Miles City, Mont., bred to grade Hereford cows gained 2.28 pounds per day compared with a gain of 2.03 pounds per day for steers sired by outbred, non-performance-tested Hereford bulls from comparable grade Hereford cows. The Line I sired steers had a cost of gain of \$16.65 per hundred, while those sired by the outbred bulls had a cost of gain of \$17.68. The steers sired by the Montana Line I bulls not only gained faster and more economically but also averaged higher in grade at the end of the feeding trial than the steers sired by the outbred bulls.
9. Yolk color determined by interaction of nutritional and genetic factors. Eggs with dark yellow yolks are sought for bakery use while uniformity in yolk color is an important factor affecting acceptability for table use. Color of yolks generally depends upon the amount of natural yellow pigments which are contributed by yellow corn, grass, or alfalfa meal in the hen's diet. Research at Beltsville shows that variation in yolk color in a flock receiving the same diet is heritable and of about the same relative range on high-pigment diets as on low-pigment diets. Yolk color can be controlled both by selective breeding and by controlling pigment intake in the diet.
10. Hens injected with lymphomatosis virus transmit resistance to this disease to chicks through the egg. Two lots of chicks from the same hens were tested for resistance to lymphomatosis. Lot I was hatched from eggs laid before the hens were experimentally exposed to lymphomatosis and lot II from eggs laid by these hens after each had received 14 injections of lymphomatosis virus. Following comparable exposures, about 55% of the chicks in lot I and only about 7% in lot II developed visceral lymphomatosis within 200 days.
11. Minimum effective level of diethylstilbestrol for breeding mink established. Mink are known to be sensitive to diethylstilbestrol, especially during the breeding season. This drug is widely used to increase rate of gain in feed-lot cattle. Since many mink raisers

depend on cattle offal as a feed source, they have been concerned lest offal from stilbestrol-fed cattle be contaminated with the drug and affect their milk. Experiments in cooperation with Cornell University indicate that a daily intake of 1.5 micrograms of stilbestrol by milk does not interfere with reproduction, while a 10 microgram daily dosage does interfere.

Dairy Husbandry Research:

1. Progress made in assessing the fertility of bulls. Studies indicate that the relative fertility of semen from bulls can be measured. This is a problem of importance in artificial insemination of cattle. The method of measurement determining the rate at which spermatozoa use the sugar fructose of the seminal fluid (fructolysis) has been developed by cooperative research with the Colorado Agricultural Experiment Station, and is being applied with encouraging results to bulls in service in two artificial breeding associations.
2. Use of artificial insemination by dairy farmers increases. Dairy farmers in increasing numbers are finding that they can obtain service of the best sires for improving the producing ability of their herds from artificial insemination associations. Records show that in 1954 there were 606,997 farm herds with 5,155,240 cows using this method of breeding. Bull studs maintained 2,661 sires, 36 percent of which were superior sires proved in the cooperative DHIA sire-proving program. Cows serviced per bull were 1,937.
3. More dairy farmers participate in cooperative DHIA program. On January 1, 1955, 41,240 dairy farmers with 1,333,366 cows were testing their herds for production in the cooperative DHIA program. This is the largest number of herds and cows ever to be on test in this program. The average number of cows per herd was 32.3, or one-third greater than in 1940. The average DHIA cow in 1954 (last available figures) produced 9,363 pounds of milk and 372 pounds of butterfat, compared with 5,512 pounds and 214 pounds, respectively, for the average dairy cow of this country.
4. Number of dairy sires proved reaches all-time high in 1954. In calendar year 1954, 667,074 lactation records were received for use in proving dairy sires. This is an increase of 42 percent over the number received in 1940. Sire provings were developed on 5,912 sires, the largest number for any one year. In 1954, 960 sires proved in this program were in use in artificial breeding associations. The average production of the daughters of these sires on which the proof is based was 11,239 pounds of milk and 475 pounds of fat, or 756 pounds of milk and 43 pounds of fat more than their dams.
5. Conditions favorable to development of lactic acid found important in making hay crop silage. Studies conducted in cooperation with the Wisconsin Experiment Station and at Beltsville have shown that good quality grass silage can be made without added preservatives when conditions favorable to the production of lactic acid in the silage are present. The most favorable conditions are a readily available supply of carbohydrate and the absence of air. When air was not

excluded, butyric acid was produced instead of lactic acid, and an undesirable type of silage produced. When the supply of carbohydrate was adequate and air was excluded, lactic acid formation was rapid. No butyric acid was formed and the quality of the silage was good. These fundamental studies will lead to a better understanding of silage-making procedures.

6. Feeding thyroprotein to dairy cows studied. The feeding of thyroprotein, a hormone product, for short periods of time (60 days) to lactating dairy cows will increase milk production about 15 percent during the feeding period. However, when the thyroprotein is withdrawn from the ration, milk production drops to below the normal level, so that the total production for the lactations is not increased. Therefore, thyroprotein feeding is to be discouraged except in special cases where an increased supply of milk is needed.
7. Relative production value for dairy cattle of irrigated pasture established. Permanent pasture in Tennessee, irrigated with 20 inches of supplemental water per year, produced an average of 257 standard cow days of grazing, or 61 percent more than the 160 days for a control pasture, over a 4-year period. For each dollar spent for irrigation there was a net return from increased milk valued at \$2.00. Dairymen having a ready source of water available could increase milk production per acre of pasture at low cost by using irrigation.

Animal Disease and Parasite Research:

1. New interpretation of the blood-serum agglutination test for brucellosis results in better classification of vaccinated cattle. The new interpretation permits an increased tolerance of one full dilution in classifying vaccinated animals as reactors, suspects, and negatives in calf-vaccinated cattle over 30 months of age. This prevents discrimination against calf-vaccinated cattle that occasionally show agglutination titers for brucellosis below the point indicating infection. Furthermore, it materially reduces the number of vaccinated animals classified as reactors and suspects, while increasing the number classified as negatives. This is done with no more risk of improperly classifying these animals than is presently the case with the standard interpretation on nonvaccinated animals.
2. Studies indicate staphylococcal mastitis spread primarily by milking. Research on mastitis with regard to the presence of pathogenic staphylococci on the teat and udder skin indicate that these organisms are not commonly found at these sites unless there are cows with infected udders shedding the organisms in the milk. These findings help substantiate the idea set forth by other workers that staphylococcal mastitis is spread primarily by milking. Consequently, in view of these findings, the application of methods similar to those used for controlling the spread of streptococcal mastitis are justified. However, other experiments have shown that a large percentage of cows that carry staphylococcal antitoxins in the blood do not have staphylococcal infected udders, indicating that these organisms are causing infections in the cow, at sites other than the udder, which might be a potential source of infection for the udder.

3. Progress made in study of bloat. Bloat research has revealed for the first time the actual mechanism of the eructation or belching that is so important in determining the cause. This was done by making x-ray moving pictures of the various parts thought to be concerned in eructation, and by placing electrodes at strategic spots along the main nerve trunk controlling the stomach by insertion through fistulas. Through an appropriate electrical stimulation, eructation is being studied and separated from rumen contraction. Disturbance of the eructation mechanism in bloat may be a key to the cause.
4. Accuracy of test for anaplasmosis verified. Tests of the diagnostic antigen for detection of carriers of anaplasmosis, conducted during the past year, showed the complement-fixation test for detecting anaplasmosis to be approximately 98 percent accurate, thus giving the industry a very accurate test for locating animals infected with anaplasmosis. These tests were based on 600 serum samples from animals of known status.
5. Tissue-culture of foot-and-mouth disease virus developed. Propagation of foot-and-mouth virus in tissue culture on a practical scale, permitting production of foot-and-mouth disease vaccine on a commercial basis, has been developed in cooperation with the staff of the Virus Research Institute in Amsterdam, The Netherlands.
6. Physical studies of viruses of vesicular diseases continued. Repeated experimental work indicates that vesicular exanthema virus is more resistant to heat treatment than the virus of foot-and-mouth disease or vesicular stomatitis. Studies of changes of degree of acidity or alkalinity (pH changes) in fresh pork following slaughter indicate that, with normal refrigeration temperatures, the pH of meat does not go below 5.5 after one month of storage, and that this change occurs primarily during the 12 hours immediately following slaughter. This pH is not low enough to destroy vesicular exanthema virus. Both vesicular exanthema and vesicular stomatitis viruses are quite easily inactivated by ultraviolet light with only a slight loss in complement-fixing titer, making it possible to use inactivated viruses as diagnostic antigens in laboratories where facilities to maintain strict quarantine are not available.
7. Transmission of air sac disease by contaminated vaccine indicated. Experiments have shown that Newcastle disease vaccine contaminated with a chronic respiratory disease agent is capable of causing the development of slight to moderate inflammation of the air sacs in approximately 50% of such cases, while birds receiving uncontaminated vaccine revealed similar lesions in only 5% of the cases.
8. Test for detection of air sac disease developed. A blood test for the detection of carriers of the causative agent of air sac disease in chickens and turkeys has been developed to the point that it is now used extensively in experimentation; however, it is not yet regarded as being practicable for field use. Research has determined without question that the principal causative agent of air sac disease in chickens and turkeys and infectious sinusitis in turkeys (a pleuropneumonia-like organism) is definitely transmitted from infected hens

through the egg to the offspring. Disposal of breeder flocks of turkeys with a history of past or present infection and replacement with clean flocks have markedly reduced the incidence of the disease in poults raised from them.

9. Typing strains of Salmonella pullorum simplified. The ammonium sulfate sedimentation method of typing standard and variant strains of S. pullorum has been further simplified to make it more adaptable for routine use by poultry diagnostic laboratories. The simplified method makes it possible to rapidly determine the type of S. pullorum isolations without resorting to time-consuming serological methods. This provides for means of diagnosis, which is extremely important for development and adoption of sound control and eradication procedures.
10. Close relationship indicated between trichomonads of swine and cattle. Three out of five pregnant heifers aborted following experimental introduction into the genital tract of trichomonads obtained from pigs. Three others similarly infected lost the parasites after about two months, but are apparently still resistant to infection with the cattle strain which almost invariably produces abortion or leads to maceration of the fetus. This suggests a close relationship between trichomonads of swine and cattle, which also is evident from the structural characteristics of the parasites of these two groups of animals.
11. Bovine genital trichomoniasis found in Western range cattle. This disease which causes reproductive failures has been detected in over 5 percent of bulls examined on the Utah range. It has hitherto been considered a disorder affecting principally dairy cattle and only occasionally beef cattle in feed lots. This finding shows that bovine trichomoniasis is much more widespread and serious than hitherto supposed.
12. Experiments on immunity to lungworms show promise. Calves exposed to a comparatively light infection with lungworms developed a strong immunity to lungworm disease which enabled them to resist a severe challenging infection. In some calves the resistance was strong enough to protect them against an overwhelming infection. Indications are that it may be possible to immunize calves against serious lungworm disease by exposing them to low-level infections.

Two out of five calves given intravenous injections of blood serum obtained from an immune bovine were resistant to an overwhelming exposure to lungworm disease. These two animals received the largest doses of immune serum, whereas the others received much lower doses. The results of this experiment afford a guide to the minimum amount of immune serum that may adequately protect grazing calves against exposure to lungworms.
13. Phenothiazine used against cattle parasites. Studies of feasible methods for systematic preventive medication against cattle parasites disclosed that phenothiazine may have an extraordinarily broad range of antiparasitic actions in the bovine host. Continuous free-choice administration of this chemical, 10 percent by weight in a base of

mixed minerals, successfully controlled stomach worms and nodular worms. The treatment had already shown promise of efficiency against such diverse parasites as cattle grubs, lungworms, and hornflies. This suggests that phenothiazine, properly employed, is the most powerful weapon available for combating losses from parasitism in cattle. It augurs also an entirely new approach to the control of cattle grubs.

14. Calves affected with coccidiosis are a ready prey to the injurious effects of intestinal worms. Calves experimentally infected with both types of parasites lost weight and suffered severely, whereas those infected with either one were less seriously harmed. This suggests that when coccidiosis occurs in calves along with worm parasites, it may be helpful to reduce the worm load by treatment to prevent serious effects of intercurrent infections of worms and coccidia.
15. No injurious effects found in treatment of ewes with phenothiazine before breeding. Treatments to remove internal parasites with this drug had no detrimental effect on estrus, conception, pregnancies and occurrence of twinning. Forty-eight treated ewes and an equal number of untreated ones had exactly the same conception rate and were equal in all other respects as regards their breeding records. The data show that apprehension regarding possible injurious effects of phenothiazine on reproduction of sheep is unfounded.
16. Pigs acquire kidneyworms by swallowing earthworms. Earthworms have been found to be a source of infection with this parasite. Earthworms, in turn, became infected by swallowing kidneyworm larvae eliminated with the urine of infected swine.
17. Methods of controlling blackhead in turkeys. Chickens experimentally infected with the parasite that causes blackhead in turkeys continued to shed these disease-producing organisms with their droppings for as long as eight months.

The blackhead organism, which affects principally turkeys, lived as long as sixty weeks on soil within the eggs of cecal worms. This suggests that the control of blackhead in poultry by range rotation to minimize the acquisition of cecal worms, as well as by treatment to remove these pests, is of prime importance.

Sanitation and proper feeding combined with preventive medicinal treatment helped to control blackhead of turkeys under field conditions. A survey showed that in 1954 from 4 to 5 percent of about 89,000 turkeys, 14 to 16 weeks of age, acquired blackhead and only about 1 percent died. This was materially lower than the morbidity and mortality from this disease in 1953, as reported by owners.

ADMINISTRATION OF PAYMENTS TO STATES, AND TERRITORIAL RESEARCH

Current activities: For work to be performed under Federal grant funds, new and revised research proposals from the State agricultural experiment stations are evaluated and approved, annual programs and budget allotments are reviewed and approved, work and expenditures of each experiment station are examined in the field, and assistance is rendered to States in the organization, planning and coordination of research. Agricultural experiment stations are operated in Puerto Rico, Virgin Islands, and Alaska. Research is conducted in Puerto Rico primarily on tropical and subtropical crops of economic importance to the continental United States including food, forage, and specialty crops. Research and extension work is conducted in the Virgin Islands in the fields of soil and water conservation, improvement of crop plants for commercial and home use, animal husbandry and development of better rural living conditions. Research in Alaska, carried on as a joint program of the Department and University of Alaska, includes soil analysis, horticulture, animal husbandry, agricultural economics, agricultural engineering, insect and plant disease control, and field crop improvement studies.

Selected Examples of Recent Progress:

Alaska:

1. New forage produced. Forage research has produced a new timothy variety that will contribute materially to grassland farming in the Territory of Alaska. Engmo, an introduction from above the Arctic circle in Norway, is very cold resistant and leafy. When seeded with Alaskaland red clover or yellow-flowered alfalfa, it produces high yields of high quality forage. Engmo-alfalfa plantings have yielded 10 to 12 tons of silage per acre in test plots. A foundation seed block is being planted in 1955 in the Matanuska Valley. Foundation seed should be available for commercial production by 1957. Some seed also may be available for forage production by that time. This is one of many examples of valuable plant introductions from high-latitude countries of Europe.
2. New land-clearing method devised. A heavy Rome disc harrow was found to be a successful land-breaking machine for preparing newly cleared forest land in Alaska. This machine, commercially available at about \$1550, is a good investment for groups of farmers or custom operators but requires too much power-- 45 horsepower on the drawbar-- for the average farmer to own and operate. The disc takes the place of a breaking plow but is cheaper and faster to operate and makes tillage much simpler. By lapping one-half of the disc width on each successive round, one to 1- $\frac{1}{2}$ acres per hour can be covered, or 8 to 15 acres a day under average conditions. A breaking plow will cover only 3 to 5 acres a day and has a similar power requirement. Under average conditions the disc costs about \$2 per acre and the tractor and operator about \$10 per acre. This is half the cost, or less, of breaking new land with a plow.

3. Diammonium phosphate proves to be excellent fertilizer. Greenhouse studies show that a new form of phosphate, called diammonium phosphate, is an excellent fertilizer. Containing 21 percent nitrogen in the ammonia form and 52 percent phosphoric acid, it is a much more concentrated material than the highest grade of treblesuperphosphate, which contains only 47 percent phosphoric acid and no nitrogen. Diammonium phosphate was in every case equal to or better than treblesuperphosphate as a source of phosphorus. On some soils, plant responses are 2- to 5-fold greater than with treblesuperphosphate. At present prices for concentrated fertilizers, diammonium phosphate can compete at \$190 to \$200 a ton in Alaska. Western manufacturers appear interested in increasing their production of diammonium phosphate.

Puerto Rico:

4. Tropical grass-legume combinations give high yields. Tests of productivity and persistence of some grass and legume mixtures have given excellent results in Puerto Rico. Combinations of tropical kudzu and Merker grass produced almost 9 tons of dry matter per acre per year. Trailing indigo and Merker grass produced an average of 7.5 tons, trailing indigo and Pangola 6.5 tons, and combinations of Para grass with either tropical kudzu or trailing indigo produced 5 tons per acre per year of dry forage. Palatability and percent consumption of these mixtures have been good, and a favorable grass-legume balance has been maintained under conditions of controlled grazing for more than two years. Legumes contributed 1/3 to 1/2 of the total production in the trials.
5. Tropical forage grasses found to contain high concentrations of oxalates. Three of the most important tropical forage grasses grown in Puerto Rico -- elephant grass, Merker grass, and Guinea grass -- were found to contain between 2.01 and 2.57 percent oxalic acid on a dry-weight basis. Extensive feeding trials by temperate-zone workers have indicated that roughage containing 1.6 percent or more of oxalates are dangerous and lead to a negative calcium balance. Further chemical and nutrition studies are under way in Puerto Rico to determine whether, and under what conditions, these tropical grasses may be detrimental to dairy cows.

Virgin Islands:

6. Superior tomato varieties found for the Virgin Islands. Tomatoes constitute one of the major vegetable crops in the Virgin Islands. Since production of the commonly used varieties has been relatively low, a trial of 42 varieties selected for possible adaptability to local conditions was carried out. Two of these introduced varieties gave yields far in excess of the local varieties. Also, several varieties proved to be exceptionally early under proper management, giving a good crop when the price is highest. This information has been provided local farmers and should enable them to increase their profits from this crop.

7. Extension activities expanded in the Virgin Islands. Because of the importance of disseminating agricultural information promptly to farm people in the Virgin Islands, the L-H Club program was extended during the year to give complete coverage of the rural public grade schools in St. Croix. The work was expanded to include livestock projects with pigs, poultry, and cattle. A weekly radio program aimed at assisting local farm people is now broadcast from the station in St. Thomas as well as from St. Croix. Articles on timely subjects now appear regularly in three local newspapers. In addition, a news letter is mailed regularly to most farmers on the three islands in order to keep them informed of the latest agricultural developments of interest to them. Farm demonstrations and canning and sewing demonstrations are a regular part of the extension program. These activities have been well received and have developed considerable interest among farm people in improving their economic and social status.

HOME ECONOMICS RESEARCH

Current activities: Investigations are conducted on human nutritional requirements, the composition and nutritive value of foods, and problems relating to the household preparation and preservation of foods. Studies are made of problems in the household utilization of textiles, clothing, and equipment, and of family requirements for housing and related facilities. Investigations are also made of food consumption practices and the nutritive value and economy of customary diets, patterns of rural family expenditures and production for household use, and economic problems of household management.

Organizational changes: As of September 14, 1955, the Department revised the organization of this work as follows:

<u>Former</u>	<u>Revised</u>
<u>Human Nutrition and Home Economics Research</u>	<u>Home Economics Research</u>
Human Nutrition Research	Human Nutrition Research
Home Economics Research	Household Economics Research
	Clothing and Housing Research

Creation of three branches, corresponding to the activities above, to replace the former two branches followed a study of recommendations made by a 15-member home economics research advisory committee, which met in Washington in July. Their establishment is expected to strengthen the Department's administrative organization for home economics research. In developing their programs, the branches will take account of the recommendations of research advisory committees, and as phases of research now under way are completed, consideration will be given to problems given high priorities by the committees.

Earlier this year, the Department had announced that it was considering proposals to shift funds from the clothing and household equipment work in order to expand nutrition research. This is not being done in order that the high priority recommendations of the advisory committee on clothing and household equipment may be implemented.

The three research activities follow closely the lines included in the advisory committee's recommendations and will include work as follows:

Human nutrition research will include investigations on composition and nutritive value of foods; human nutritional requirements and the body's response to nutrients, foods, and diets when eaten in varying amounts and proportions; cooking quality and utility of foods and factors that affect these; and the development of improved procedures and conditions for household processing and storage of foods.

Household economics research will include investigations of the levels of food consumption and nutritive value and economy of customary diets of various population groups; patterns of rural family expenditures and household production for family use; economic problems of household management, including the effect of the economic situation on family living; and application of economic and other scientific information to the development of recommendations for effective and economical use of food and other family resources for higher levels of living.

Clothing and housing research will include studies of the quality and utility of fabrics, clothing, and household textile articles for different household purposes; kinds and characteristics of housing and household equipment needed to meet family requirements for efficient housekeeping and comfortable living; and the development of information basic to improved use and care of clothing, household textiles, the house and its equipment and facilities.

Selected Examples of Recent Progress:

1. Farm families spend one-quarter of their net cash income for food. Farm families in the north-central region consumed in a year food valued at \$1,360 retail, or nearly a dollar a day per person, according to a survey made in 1952. Almost half of the food (45 percent) came from the home farm. Despite this large amount of home production, farm families spend substantial sums for purchased food, accounting for a significant share of the food market. Farmers in the north-central region paid out on average of \$740, a sum equal to one-quarter of their annual net money income (after taxes), to buy food for their families. Farm families in this region with incomes below \$2,000 had average food purchases of \$540; those with incomes of \$4,000 or more spent an average of \$940 a year for food.
2. Home and Garden Bulletin entitled "Do you get enough Milk?" issued. This bulletin tells individuals how to make practical application of research findings by scientists in human nutrition and home economics on the value and use of milk and milk products. It points out that milk is very important nutritionally, because of the large share of calcium, riboflavin, and protein in today's average diet that it

supplies, and also because of its other contributions to good nutrition. A guide to amounts needed is given--for example, 3 to 4 cups a day for children, a quart or more a day for teen-agers, and 2 or more cups for adults. Ways to get more milk in diets, the importance of milk in reducing diets, and pointers in using and choosing among different kinds of milk are also included.

3. New tables issued on pantothenic-acid values of foods. These tables will make possible the first calculations of the pantothenic-acid content of customary diets of population groups. Pantothenic acid is a B-vitamin essential to human nutrition.
4. Tables of amino acids in foods published. Tables showing the content of 12 nutritionally important amino acids in foods have been prepared for publication, representing a compilation of published and unpublished data from Department and other laboratories and data from scientific literature. These tables are urgently needed by the Department and by nutritionists and other groups concerned with the protein quality of food supplies and diets. The data will be used to estimate the amino-acid content of the per-capita food supply of this country and of the diets of households and individuals.
5. Data on fatty acids in foods assembled. Data on the fatty-acid content of foods, assembled from laboratory analyses made under contract and from published literature, are being prepared for use in estimating the fatty-acid content of food supplies and diets. Linoleic acid is the "essential" fatty acid most widely distributed in foods. Pork and poultry fat are better sources of linoleic acid than beef and mutton fat. The common vegetable oils, particularly cottonseed, corn, and soybean, outrank the animal fats as sources of linoleic acid; but after hydrogenation for shortenings and margarines their content of this nutrient may be reduced to about that of beef fat and butter. Nuts also tend to be good sources of linoleic acid. Such data are urgently needed in view of the increased interest in the importance of fat in human nutrition and the need for defining desirable limits in the quantity and kinds of fat in diets.
6. Diet and serum cholesterol in men compared. Findings from two cooperative studies of food intake in relation to nutritional status of men 50 to 80 years of age throw light on the relation of dietary fat to blood cholesterol in aging men. In a California study of more than 274 men, serum cholesterol (often associated with hardening of arteries) was found to be markedly lower in men in a county home than in retired men living in their own homes; was highest among men in the 50-to-60-year age group and much lower after 70 years of age; and was related to fat intake. In a group of more than 100 Minnesota business men over 50 years of age, serum cholesterol averaged higher than in either of the California groups, but the relation to fat intake was less clear.
7. Data on diets of individuals published. Substantial progress has been made in the publication of results from the north-central and western regional cooperative studies of food intake and nutritional status. During the year, 13 papers relating to children and 13 relating to older persons have been published in scientific journals and bulletins,

and many others are ready for publication. The dietary findings for children, often backed up by corresponding biochemical data, indicate that intake is lower than desirable in the case of calcium, vitamins A and C, and (in some areas) thiamine. Diets of teen-age girls are relatively lower in most nutrients than those of boys, and adolescent diets are relatively lower than those of younger children. Facts such as these help to guide food-distribution and educational programs for improving human nutrition.

8. New data obtained on stain removal from present-day fabrics. Research necessary to bring up to date Farmers' Bulletin 1474, "Stain Removal from Fabrics; Home Methods," (last revised in 1942) has been completed. This bulletin, first issued in 1917, has been one of the Department's most sought-after publications. With a total distribution of over 5 million copies, it ranks No. 4 in popularity among all those published since 1904. Special attention in the revision has been given to removal of stains from fabrics of recently-developed man-made fibers; new types of stains, such as those from ball-point-pen ink and aluminum paint; and new stain-removal methods made possible by modern products now available to homemakers.
9. Efficiency of household washing machines determined. Studies of the effect of machine design and methods of use on washing efficiency showed that no one kind of machine--automatic or nonautomatic--nor one type of washing mechanism was consistently superior to others in soil removal. Although centrifugal water extractors removed more water than wringers, there was little difference in the amount of soil removed. Best results were obtained when an agitated soak of 15 minutes in 100°F. water with soap preceded the washing; when the weight of washing load was 6 to 7 pounds regardless of claims as to the machine's capacity; when 160°F. water was used in preference to to water of lower temperature in the wash; and when washing time was at least 10 minutes.
10. Design data provided on utility space in farm homes. New design data, taking account of needs shown by regional surveys of farm families, have been developed and made available to those planning space for storage of clothing and household linens and for home food preservation in farmhouses. This and related information, resulting from cooperative housing research by the Department and State agricultural experiment stations, provide architects and builders with the data needed to improve the functional quality of farm dwellings.

UTILIZATION RESEARCH

Current activities: Investigations are conducted in the field of chemistry and related physical and biological sciences to develop new and improved foods, feeds, drugs, fabrics, industrial chemicals, and other products from agricultural commodities; to devise improved methods for evaluating the suitability of commodities for processing; to devise better processing methods; to increase the use of byproducts; and to solve waste disposal problems thus effecting maximum utilization of agricultural commodities.

Selected Examples of Recent Progress:

1. Improved thickening agent found for canned and frozen cooked foods. Research on thickened frozen cooked foods and canned foods, including sauces, gravies, custards, puddings, and cream puff fillings, has shown that undesirable changes in consistency of the product during storage can be satisfactorily prevented for 6 to 12 months by the use of thickening agents made from waxy types of rice or corn. These "waxy" grains are specific varieties with kernels having an unusual chemical composition. Liquid separation and a curdled appearance in processed food products are serious defects from the standpoint of consumer acceptance. Many manufacturers are now solving these problems by using the newly developed waxy-cereal thickening agents.
2. Prevention of wool yellowing studied. Basic studies of the breakdown of wool structure by light reveal that a newly discovered type of chemical compound will inhibit wool yellowing in much the same way that anti-knock compounds inhibit pre-ignition of gasoline motor fuels. With the increasing demand for white and pastel-shade fabrics, the yellowing problem in wool has become more and more important. The yellow color produced in wool by light is not removed by washing, bleaching, or other known processing techniques. Prevention of the yellowing seems to be the only promising line of attack on the problem, and these findings point the way to achieving this important objective.
3. Information obtained on freezing of bakery products. Investigation of the rate of freezing of freshly baked bread and some other bakery products in a refrigerated air blast, and of the rate of defrosting these products by several methods, has disclosed the conditions that are essential for greatest retardation of staling. The staling rate of bread is greatest in the temperature range between 20°F. and 45°F., and loaf temperature must be reduced or raised rapidly through this temperature zone to minimize staling. Information of this kind is essential for successful large-scale production and distribution of frozen bakery products.
4. Stable grape- and apple-juice powders developed. Fruit-juice powders represent the ultimate in concentration of juices. In this form, they can be packaged, transported, and stored at considerably lower costs than in other concentrated forms. Powders from apple juice and Concord grape juice have been prepared that will store satisfactorily at 100°F. for 6 months, which meets the rigid requirements of the Army Quartermaster Corps. The stability of these powders is due primarily to their very low moisture content, which is achieved by use of an in-package desiccant. Stable juice powders of this kind offer tremendous possibilities for increased use of fruit-juice products.
5. New type plastics prepared from fats. Further improvements in the production of "internally plasticized" plastics made from animal fats have been made. By the use of a new compound made from fats (vinyl epoxystearate), both internal plasticizing and internal stabilizing action is imparted to the vinyl-plastic composition. This type of

plastic has superior ability to retain both its stability and plasticity. Plastics containing fats offer advantages in the preparation of certain products, such as rigid pipe, certain types of film and sheets, and outdoor emulsion paints. Their future use in increasingly larger quantities seems assured.

6. Large outlet developed for animal fats in feeds. In the past, our inedible fats have found use mainly in the soap kettle. But in the last decade nearly 1.5 billion pounds per year of these fats have been replaced by synthetic detergents, which has resulted in huge fat surpluses and low prices. In research to alleviate this surplus, conducted partly under contract, information has been obtained that has led to large-volume outlets for animal fats in feeds. When properly stabilized, fats are particularly attractive for feed use because of their high caloric value and the fact that they increase palatability of the feed, make pelleting easier, and help to eliminate dust problems. Consumption of fats in animal feeds already exceeds 200,000,000 pounds per year. This has been an important factor in lifting the price of fats from about 5¢ to 7-1/2¢ per pound and establishing a floor under the price at the higher level. It has contributed to increased returns to the livestock industry of some \$50 million per year.
7. Improved equipment developed for making evaporated milk. Pilot-plant scale equipment has been designed for sterilizing milk, concentrating it, and canning the concentrated product without exposing it to contamination by bacteria. Milk produced with this equipment has been proved to be sterile. In making evaporated milk without developing brownish color and cooked flavor, it is necessary to sterilize by heating to a relatively high temperature for a short time. It is desirable to accomplish this sterilization prior to concentration. This in turn requires that the concentrated sterile milk be canned aseptically--that is, without bacterial contamination. The novel equipment developed for this purpose is essential for a broad program of research on the manufacture of improved concentrated milks, and it is suitable also, in principle, for commercial use.
8. Commercial production of gluconates from corn sugar started. The process developed for manufacturing sodium gluconate from corn sugar has been adopted recently by an industrial concern, which is producing the material at the rate of 1,000,000 pounds per year for use as a constituent of bottle-washing and aluminum-etching products containing up to 10 percent of sodium gluconate. The compound's usefulness in these preparations results from its ability to tie up calcium, magnesium, and other metallic impurities that occur in water, thereby preventing deposition of scum on the surface of the article that is washed or etched. Use of sodium gluconate for removal of metal ions in other processes is expected to materially increase demands for the compound. Present production of sodium gluconate is in addition to the more than 1,000,000-pound annual production of gluconic acid and calcium gluconate, based on earlier work.

9. Antioxidants produced from corn sugar. Corn sugar has been converted by reaction with various amine salts into a new group of potent antioxidants known chemically as amino reductones. These compounds were found to be much more effective than present commercial food antioxidants in preventing deterioration of vegetable and animal fats and oils. If further evaluation tests fulfill present expectations and the compounds are found to be nontoxic, there will be a considerable market for them in the food field. The need for superior antioxidants in rubber, petroleum, and other nonfood applications may also provide a large market for these amino reductones derived from agricultural materials.
10. Hybrid yeasts with industrial possibilities produced. Hybridization of higher plants has long been a profitable field of research. Hybridization of yeasts has been more difficult. A procedure has been devised by which yeasts not hybridizable by previous methods can now be crossed by using masses of cells. Hybrid yeasts that will ferment both lactose and maltose have been produced. Such a unique combination of properties may be expected to find application in the food industry. For example, the fermentation of lactose might serve (1) in special instances as a source of carbon dioxide in the manufacture of pastry or bread, or (2) as a means of eliminating lactose from products like ice cream, in which lactose forms sharp, undesirable crystals. The new yeast-hybridization procedure is expected to be useful in developing other new hybrids important to the food and feed industries.
11. Polyamide resins from soybean oil make gelled paints practical. Polyamide resins previously developed from soybean oil have been found by industry to combine with most paint vehicles to give a new type of gelled paints--a protective coating made to order for the do-it-yourself painter. These paints, which become less viscous and flow readily under pressure of a roller, are very easy to spread. The key ingredient responsible for this change of regular drying-oil vehicles into "gelled" vehicles is the polyamide resin, heretofore mostly used in heat-sealing of candy wrappers and in glossy finishes for paper, wood, and many other materials. Another ingredient used in these gelled paints (soybean alkyl) contains substantial amounts of soybean oil in addition to that used in the polyamide resin. This is one way in which soybean oil is now meeting competition from coating constituents derived from nonfarm sources.
12. New industrial chemicals made from soybean oil. New compounds--vinyl ethers of soybean alcohols--have been prepared by chemical modification of soybean oil. These non-volatile ethers can be converted to paint vehicles expected to be of use in making air-dried or baked finishes. Evaluation studies indicate that hard and durable films can be obtained from these ethers by baking. These films have unusual resistance to acid, alcohol, and alkali--an important property for finishes needed in many industrial applications, particularly for consumer products. Further work is under way to evaluate fully the usefulness and importance of these ethers in protective coatings. They represent one of many possible types of industrial chemicals or intermediates which may help the vegetable-oil industry to capture new markets.

13. New long-staple cotton shows promise. Good processing quality and superior yarn properties -- this sums up the evaluation of the experimental cotton Pima S-1, a high-yielding long-staple variety. In the processing tests, two long-staple cottons were used for comparison purposes -- Karnak imported from Egypt and American-Egyptian Pima 32, grown domestically. Processing behavior of Pima S-1 was generally equal or superior to that of the other two. Yarns from Pima S-1 were superior in strength and uniformity to yarns of Karnak cotton, and were as strong as and more uniform than those of Pima 32 cotton. This study was part of a program being conducted cooperatively with the National Cotton Council to develop and evaluate interspecies cottons.
14. Operation of cotton carding machine improved by new stripper. A new device for continuously removing cotton fibers impacted on the wire covering of the main cylinder of cotton carding machines is being readied for use in the textile industry. On the basis of initial trials in a textile mill, the device should perform satisfactorily in production operations with only minor modifications. Cards equipped with the new stripper operated up to 80 hours without hand stripping, compared with standard mill practice of hand stripping after 3 or 4 hours of operation. A second advantage is the improvement in cotton products resulting from a more uniform card sliver -- the loose strand of cotton produced by the carding machine. A third advantage indicated in trial tests is the increase in yield of usable fiber -- one-half to one percent less cotton was removed as waste by the card. For the United States cotton industry, a saving of one-half percent for the 9 million bales processed annually would be equivalent to about 45,000 bales, with a value of \$6 million assuming all 76,000 domestic cards were operated with the new stripper. The Department inventors named the device the Retracto-Pin Card Stripper.
15. Necessity of zero storage for frozen concentrated orange juice confirmed. A 3-year investigation has further demonstrated to the citrus industry that temperatures of 0°F. or lower must be maintained to insure retention of quality in frozen concentrated orange juice during storage and distribution. This product is now worth more than \$200 million at retail. Samples of commercial concentrates from leading Florida packers were stored at constant temperatures of -4°F. up to 35°F. Only at -4° did no detectable changes occur within a year, and after 3 years at this temperature the samples showed excellent retention of flavor and Vitamin C, no marked loss of "cloud" (no clarification), and no gel formation. At 10° and higher the rate of deterioration was too rapid to be acceptable in commercial practice. At 5°, there were definite changes after 2 years: and after 3 years, while the concentrates were still palatable, they had suffered some loss of flavor, more or less severe loss of cloud, and pronounced gelation. Since commercial frozen orange concentrates may be purposely or inadvertently stored for extended periods of time, knowledge of the temperatures necessary to maintain high quality up to 3 years or even longer is important to processors, brokers, warehousemen, and retailers.

16. Poor quality pickles traced to molds on flowers adhering to cucumbers being brined. Enzymatic softening of commercially brined cucumbers represents a serious economic loss to the pickle industry, estimated to run as high as \$2 million annually. Research during the past 4 years, in cooperation with the North Carolina Agricultural Experiment Station, the pickle industry, and Harvard University, implicates molds that develop on the growing cucumber plant, particularly the flowers, as the primary source of the softening enzymes. Two seasons' experiments under commercial brining conditions in two sections of the South demonstrated a high correlation between the numbers of blossoms in the vats and the proportion of softened off-grade cucumbers. Removal of the flowers before brining yielded brines of very low enzyme activity and exceptionally firm pickles. Firm pickles were also obtained by replacing enzyme-active brine with fresh brine after 36 hours. Now that the source of the softening has been pinpointed, research workers and the pickle industry can intelligently attack the problem of developing simple and practical procedures to avoid losses due to softening.
17. New oilseed process proved commercially. The first cottonseed oil mill to adopt the Department's filtration-extraction process operated successfully throughout 1954. Plant profits increased \$750 per day when the plant shifted from hydraulic processing to filtration-extraction. On the basis of certified analyses, this is the first direct-extracting solvent plant to produce oil and meal superior to hydraulic products. Simple and economical to operate, the plant can shift easily from cottonseed to soybeans, and vice versa. Results confirm laboratory findings that this solvent process should be economically attractive for smaller mills. Small-scale processing tests indicate that filtration-extraction is applicable also to many minor oilseeds, including sesame, peanuts, rice-bran, flaxseed, castor beans, and milo germ.
18. New direct-consumption sugar produced by low-cost process. A new quality of sugar for direct consumption has been produced experimentally from sugarcane by a process using resin materials (ion exchangers) to purify the cane juice. This sugar is suitable without refining for use in many food products, particularly candy and confections. Yields of cane sugar obtained in the laboratory by the new process are higher than those of conventional processes. Under Louisiana conditions, for example, the increase in yield amounts to about 12 to 15 pounds of sugar per ton of cane of average sucrose content. Experimental work is under way in Puerto Rico to determine the potential application of the ion-exchange process to canes of that area. The new process promises to make available a direct-consumption sugar suitable for use in clear hard candies and white or bright-colored candies--outlets not open to other less expensive qualities of sugar. Cost of this new ion-exchange sugar is expected to be about 1/2 cent per pound less than refined sugar. While laboratory results are promising, tests on a larger scale are needed to obtain the engineering data needed to evaluate fully the commercial feasibility of the new process.

19. New pine-gum chemical produced commercially. Maleopimaric acid--a white crystalline material made from pine gum-- went into commercial production in 1955. This development resulted from several years of cooperative work by Government and industry; it is a new product and represents a distinctive step forward in the effort to create new outlets to bolster the sluggish market for pine-gum chemicals. The acid has chemical properties that make it useful in resins, surface coatings, photographic chemicals, printing inks, etc. To produce the acid, industry adopted the process developed and patented by the Department's Naval Stores Station. The process is unique in that the product is obtained directly from pine gum, in addition to conventional turpentine and rosin. It is simple, too. Cleaned pine gum and maleic anhydride, an industrial chemical, are mixed and heated to form maleopimaric acid, which separates on cooling and is removed by centrifugation.

20. New research tool for meat studies developed. Slime-forming bacteria that grow on the surface of refrigerated meat, meat products, and meat during curing are an important factor in limiting storage life. Although it has been assumed, from previous knowledge, that the slime bacteria are of a polysaccharide nature, there is little actual information on them. Recent work has resulted in development of a method for identifying the slime-forming polysaccharides, based on a color reaction within the bacterial cell. This development provides a tool with which various organisms and types of meat or meat constituents, can be tested for polysaccharide formation.

PLANT DISEASE AND PEST CONTROL

Current Activities: The work is divided into three categories: (a) Insect and plant disease control which is designed to protect agriculture from destructive insects and plant diseases, including inspection to detect and appraise infestations, certification of regulated articles, supervision of treatments required by plant quarantines, applications of pesticides, and use of other methods of combating infestations; (b) protective measures, primarily inspections at ports of entry, which are carried out to prevent the introduction from abroad of pests and plant diseases, and certification of the absence of plant pests on plants and plant products for export; and (c) administration and enforcement of the Federal Insecticide, Fungicide, and Rodenticide Act to prevent the sale of mislabeled and inadequately labeled economic poisons, and to safeguard farmers and other users from injury to crops, livestock, or themselves, and from loss resulting from deceptive, careless or fraudulent marketing practices.

Selected Examples of Recent Progress:

Plant Pest Control:

1. Japanese-beetle infestations controlled by dieldrin. Dieldrin, one of the newer hydrocarbon insecticides, has been under field test as a soil insecticide for Japanese beetle control for several years. Observations during 1954 and 1955 on 6,560 acres treated in the vicinity of Sheldon, Ill., indicate greatly reduced Japanese-beetle populations and, in many cases, the complete absence of grubs. Treatments such as this show considerable promise as a practical tool for suppressing outlying infestations and for such specialized regulatory uses as the disinfestation of airfields and environs to reduce the hazard of long distance spread of the beetles by commercial or military aircraft.

The Federal regulated area of Japanese-beetle control remained unchanged during the fiscal year. (See Fig. 11).

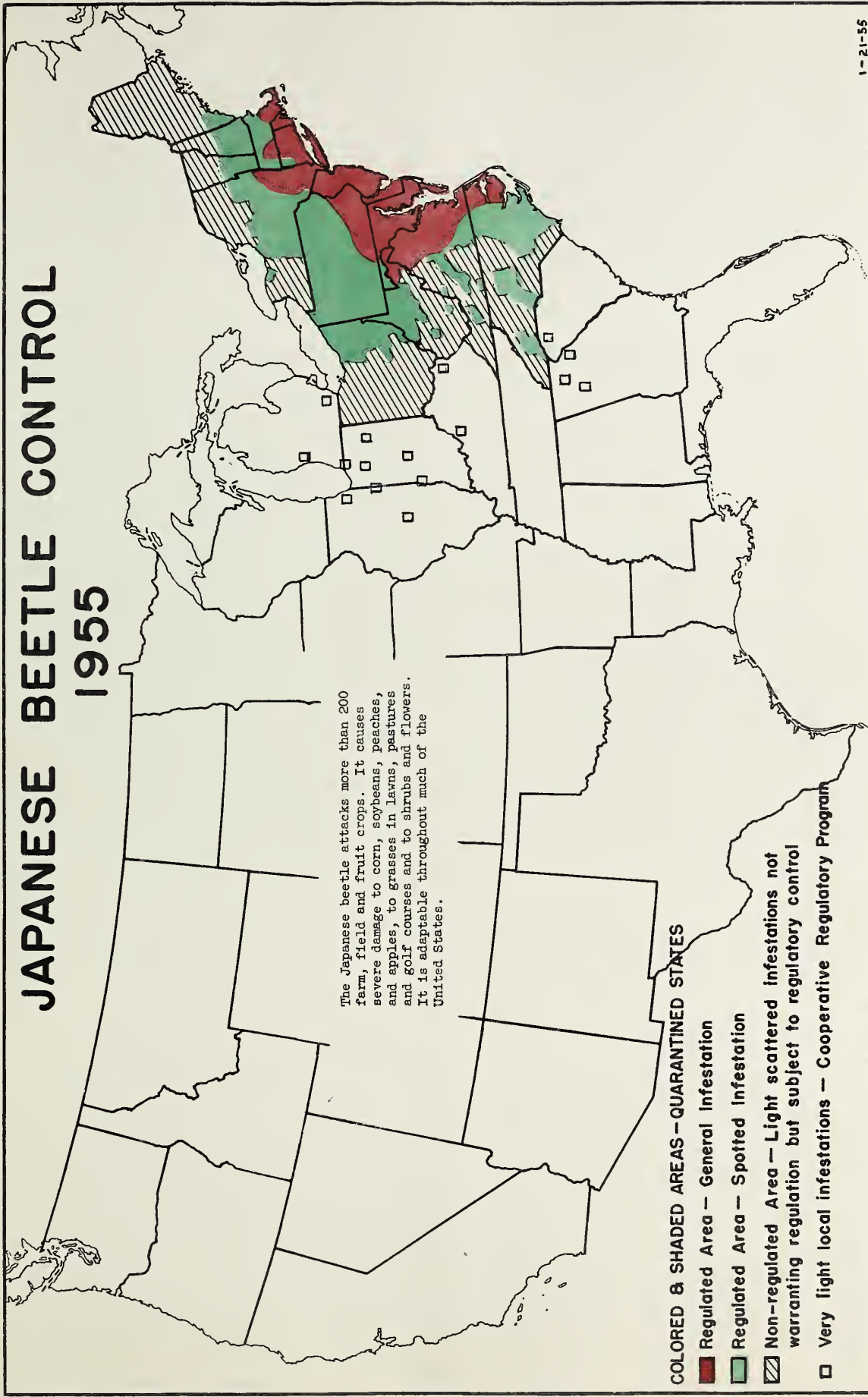
2. New treatments aid in sweetpotato weevil control. For the first time in the history of sweetpotato weevil control operations, there is now available a method making it possible to suppress the weevil in the field while potatoes are being formed. This consists of the application of 2 lbs. of dieldrin to the acre, applied to the soil in a narrow band to the crowns of the plants. This treatment will be of value especially in areas where cultural controls have been most difficult to obtain because of the presence of wild host material in nearby uncultivated areas. Farmers in southwest Louisiana applied dieldrin to approximately 12,000 acres of the 1955 sweetpotato crop. The first million bushels harvested from the treated area showed only one to two percent infestation as compared to an average of 12 percent in 1954 when damage ranged in some instances from 80 to 100 percent.

JAPANESE BEETLE CONTROL 1955

The Japanese beetle attacks more than 200 farm, field and fruit crops. It causes severe damage to corn, soybeans, peaches, and apples, to grasses in lawns, pastures and golf courses and to shrubs and flowers. It is adaptable throughout much of the United States.

COLORED & SHADED AREAS - QUARANTINED STATES

- Regulated Area - General Infestation
- Regulated Area - Spotted Infestation
- Non-regulated Area - Light scattered infestations not warranting regulation but subject to regulatory control
- Very light local infestations - Cooperative Regulatory Program



The Louisiana sweetpotato weevil quarantine was amended to strengthen regulations pertaining to dates of harvest, field cleanup, and winter plowing. The new quarantine also regulates the period during which treatments are applied to seed potatoes and potatoes for storage, and the dates for disinfecting of seed-beds and for cleaning of storage warehouses. These changes brought six parishes in southwest Louisiana into the area where intensive sweetpotato work is carried on. The heaviest sweetpotato production in the country, involving 20,000 growers, is located in this part of the State. Figure 12 shows the status of the sweet-potato weevil control program.

3. Citrus blackfly found for the first time in Texas. Inspections have been made in Texas since 1949, but no infestations of this pest were found until the 1955 season. On May 31, 1955, a single tree was found infested in the City of Brownsville; on August 8 two additional infestations were discovered south of Weslaco, near Progresso, in Hidalgo County where some commercial citrus was involved; and on September 20 and 26, two infestations on single trees were located in Laredo, Texas.

The Federal and State pest control agencies are cooperating with industry to eradicate these incipient infestations. Experience in Mexico indicates such infestations can be eradicated when an aggressive program is promptly undertaken. Surveys are continuing in northeastern Mexico in cooperation with Mexican officials in order to determine presence of this pest between the generally infested area in Mexico and the border. When an infestation is discovered in this buffer area, it is reported to the Mexican Blackfly Committee, which then inaugurates an eradication spray program. The finding of these widely scattered incipient infestations in Texas has made necessary an increase in the scope of the survey in Texas and northeastern Mexico and additional survey crews are now at work. The status of the citrus blackfly control program is shown in Figure 13.

4. Drought in northeastern Mexico reduces Mexican fruit fly migration into Texas. The dry weather in northeastern Mexico greatly reduced the number of Mexican fruit flies migrating into the citrus area of southern Texas during the 1954-55 crop year. Normally, flies develop each year on citrus and native plants below the international border and migrate northward in large numbers before Texas fruit has been completely harvested. This necessitates an intensive fruit sterilization program to prevent the further spread of this pest through commercial channels. Since relatively few flies moved into Texas, the fruit crop was harvested and shipped with a minimum of regulatory treatments. The status of the Mexican fruit fly control program is displayed in Figure 14. (See also "Contingency Fund," item 15(b) for additional information on Mexican fruit fly control in California).

5. Incidence of phony peach disease in the Southeast reaches lowest point in ten years. Inspections in the Southeast in 1954 revealed the lowest incidence of phony disease of peach in ten years and, in the severely affected central Georgia counties of Crawford, Houston, and Peach, it was at its lowest point since 1939. Overall infection in the Southeast involved 0.8 percent of the trees examined, as compared with the 1.3 percent infection found in 1953. The inspection in 1955 of over 4 million trees in the 9-State area indicates the phony disease incidence will be about the same as in 1954. Of the 38 nursery planting sites inspected in 6 States, 34 were approved for planting purposes. The reduction in phony disease incidence is largely attributable to (1) particular emphasis on the value of removing or killing wild plums in orchard areas for the past several years, and (2) almost 100-percent inspection coverage during the past four years. (See Figure 15).
6. The cooperative peach mosaic control program has reduced losses. Since 1934, mosaic has infected more than 400,000 peach trees in the Southwest and West. Recently, however, cooperative control programs have reduced these losses to a minimum. During the 1955 season, for example, only 5,354 infected trees were found out of nearly 2.2 million inspected in a 7-State area. This represents a disease incidence of 0.23 percent as compared with 4.16 in 1935. It has been repeatedly demonstrated that annual inspections followed by prompt removal of infected trees on an area-wide basis will reduce losses to the point where profitable returns may be expected during the average life of an orchard. The failure of growers in some localities to remove tolerant peach varieties may account for local increases in the incidence of peach mosaic during 1955, particularly in Colorado. Trees were found infected for the first time this year in Limestone County, Texas, and the area involved in Los Angeles and San Bernardino Counties, California, was found to have increased somewhat.

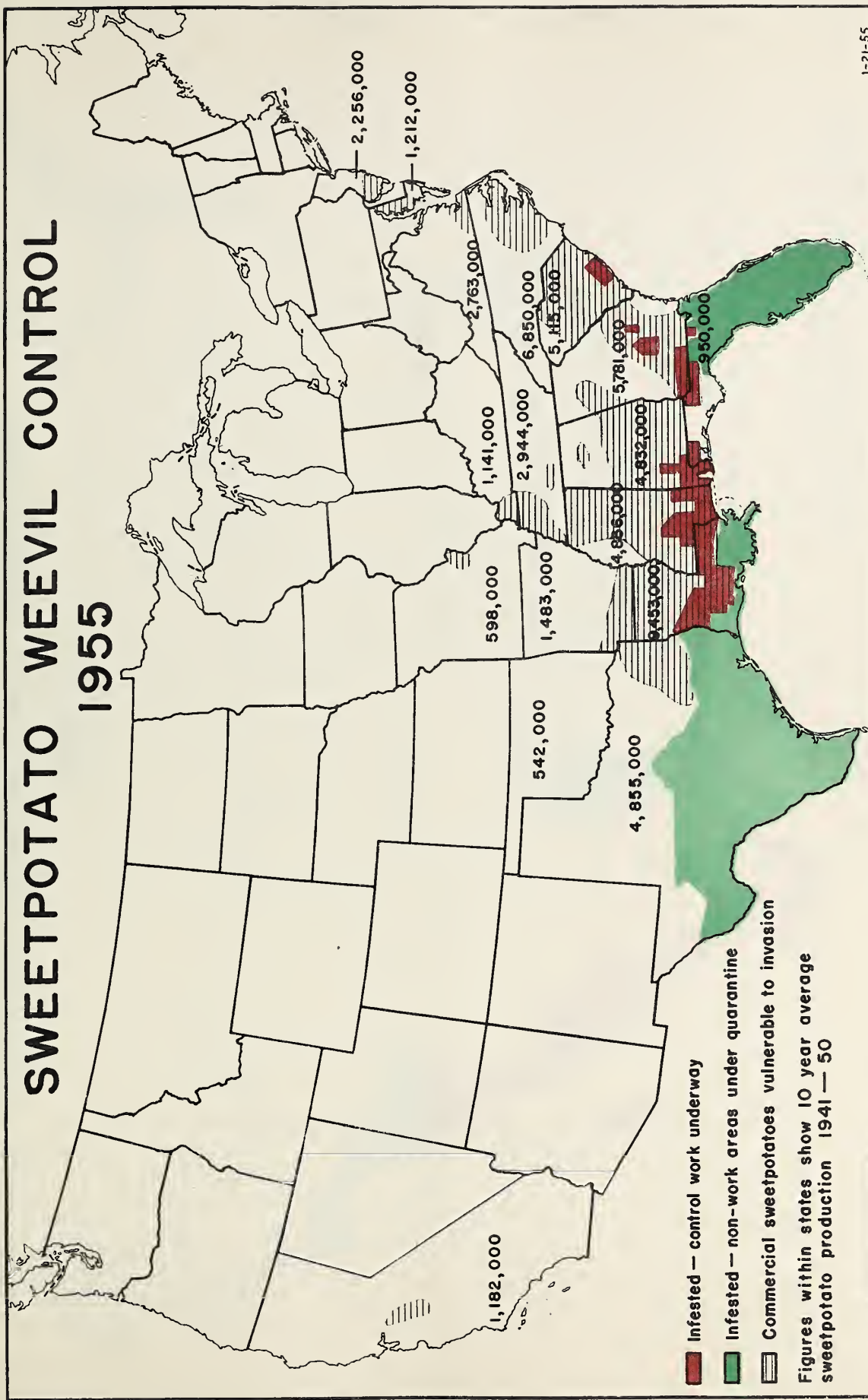
Peach mosaic control has been hampered for years because the vector or vectors were not known. Experimental evidence now indicates that an obscure mite may be responsible for the transmission of this disease. It is believed that when more information is available concerning the biology and habits of this mite, greatly improved control methods will follow. The status of the peach mosaic control program is in Figure 16.

7. Incidence of barberry infestation reduced substantially in two additional States. Eradication of barberry bushes in Indiana, Montana and Missouri has progressed sufficiently to permit placing these States in a maintenance category, along with South Dakota, North Dakota, and Wyoming. Re-examination of barberry sites in these States, and the remaining work in Nebraska, is now being handled principally by State agencies and property owners.

Kansas became the 19th State to cooperate in barberry eradication. With the appropriation of funds for barberry work by the Kansas

SWEETPOTATO WEEVIL CONTROL

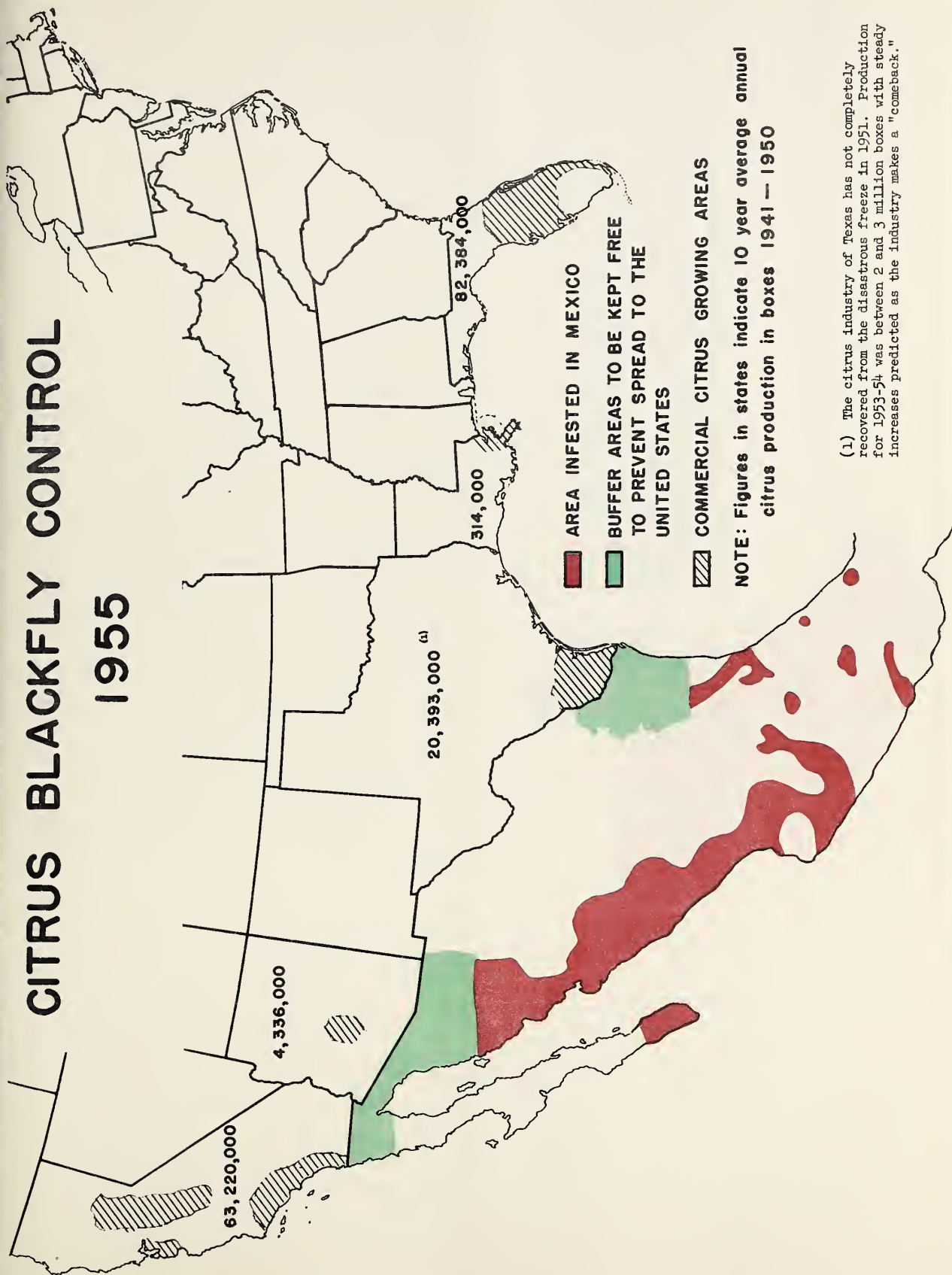
1955



1-21-55

Figure 12

CITRUS BLACKFLY CONTROL 1955



(1) The citrus industry of Texas has not completely recovered from the disastrous freeze in 1951. Production for 1953-54 was between 2 and 3 million boxes with steady increases predicted as the industry makes a "comeback."

Figure 13

MEXICAN FRUITFLY CONTROL 1955

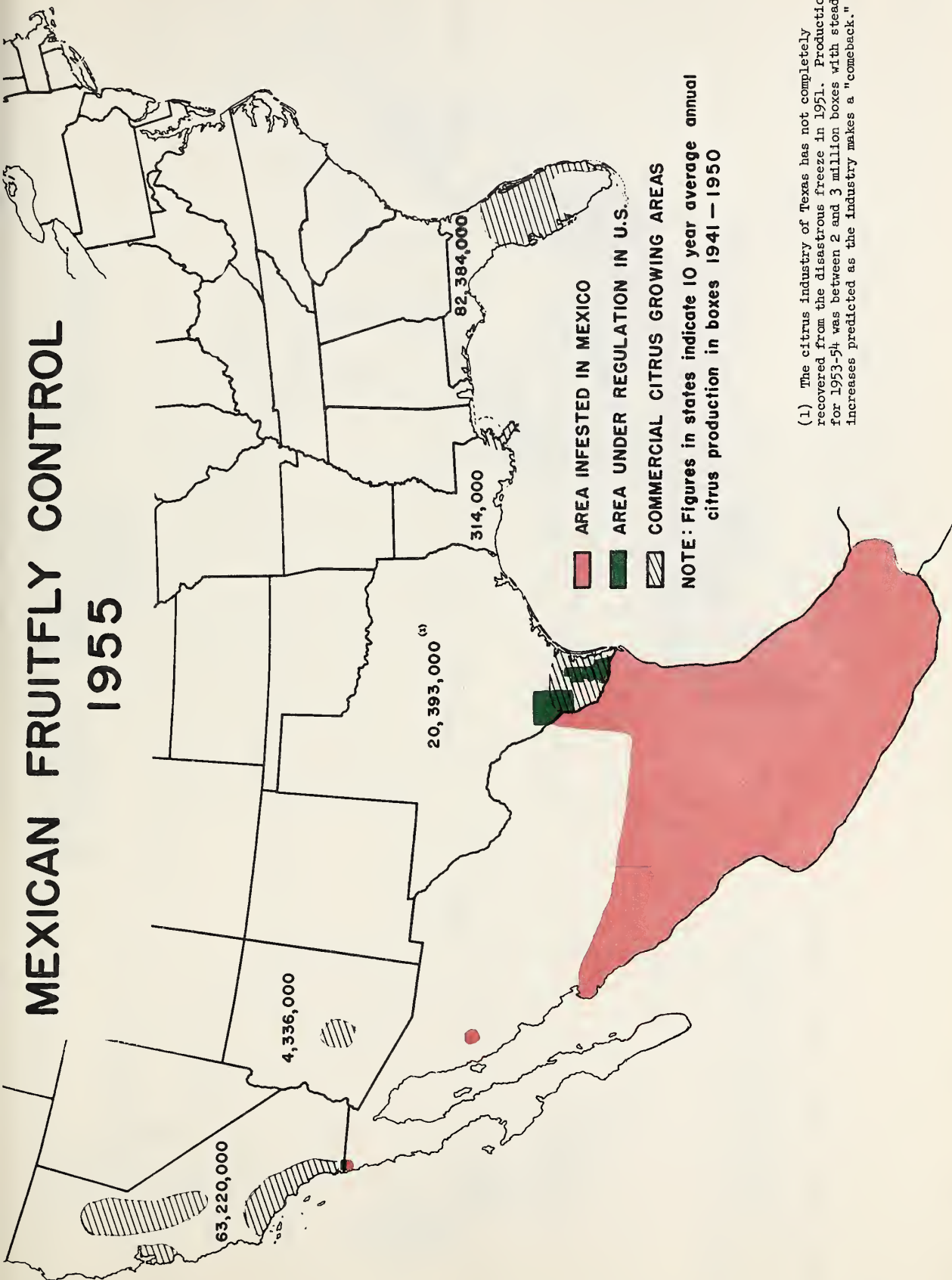


Figure 14

PHONY PEACH CONTROL 1955

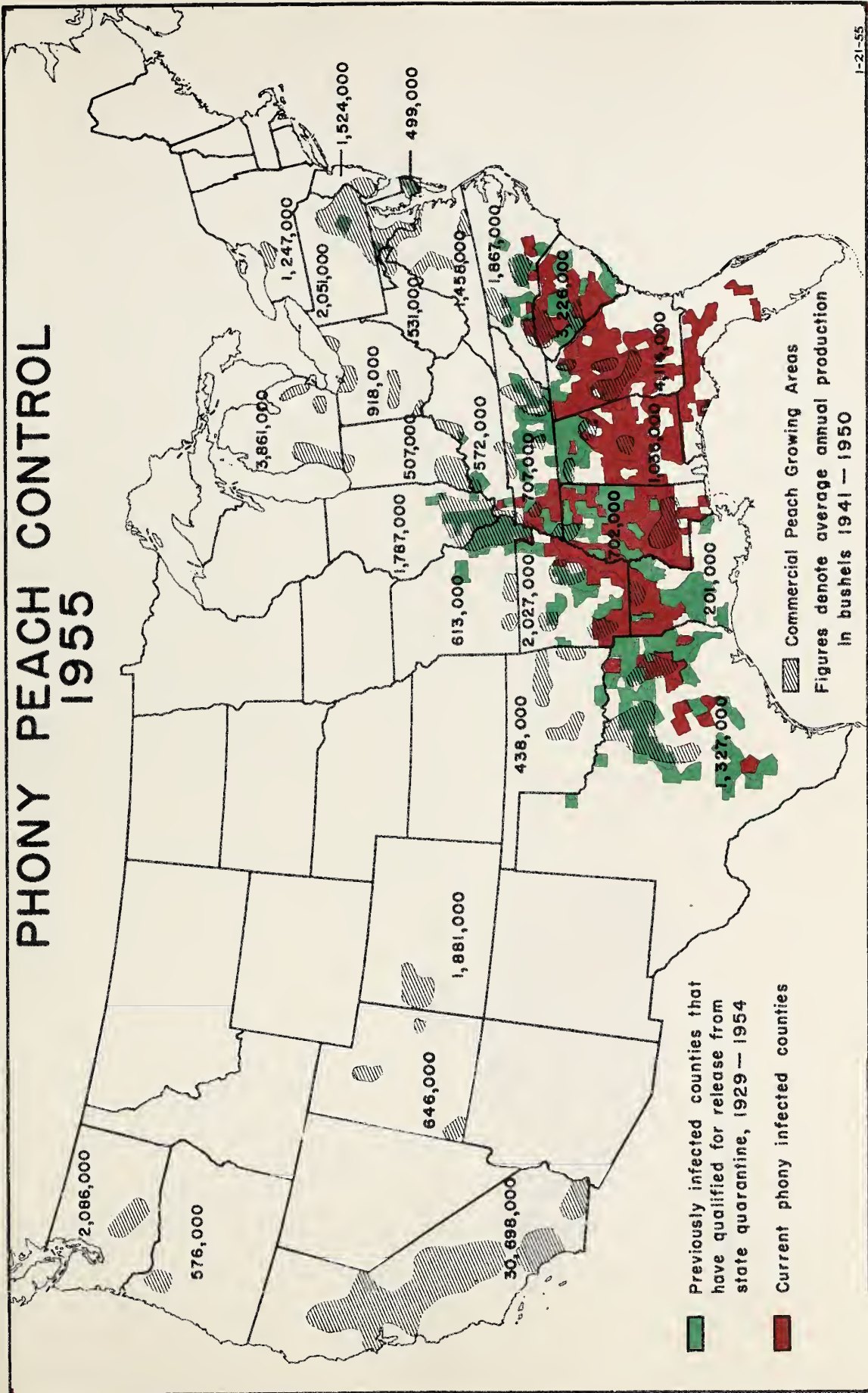


Figure 15

PEACH MOSAIC CONTROL 1955

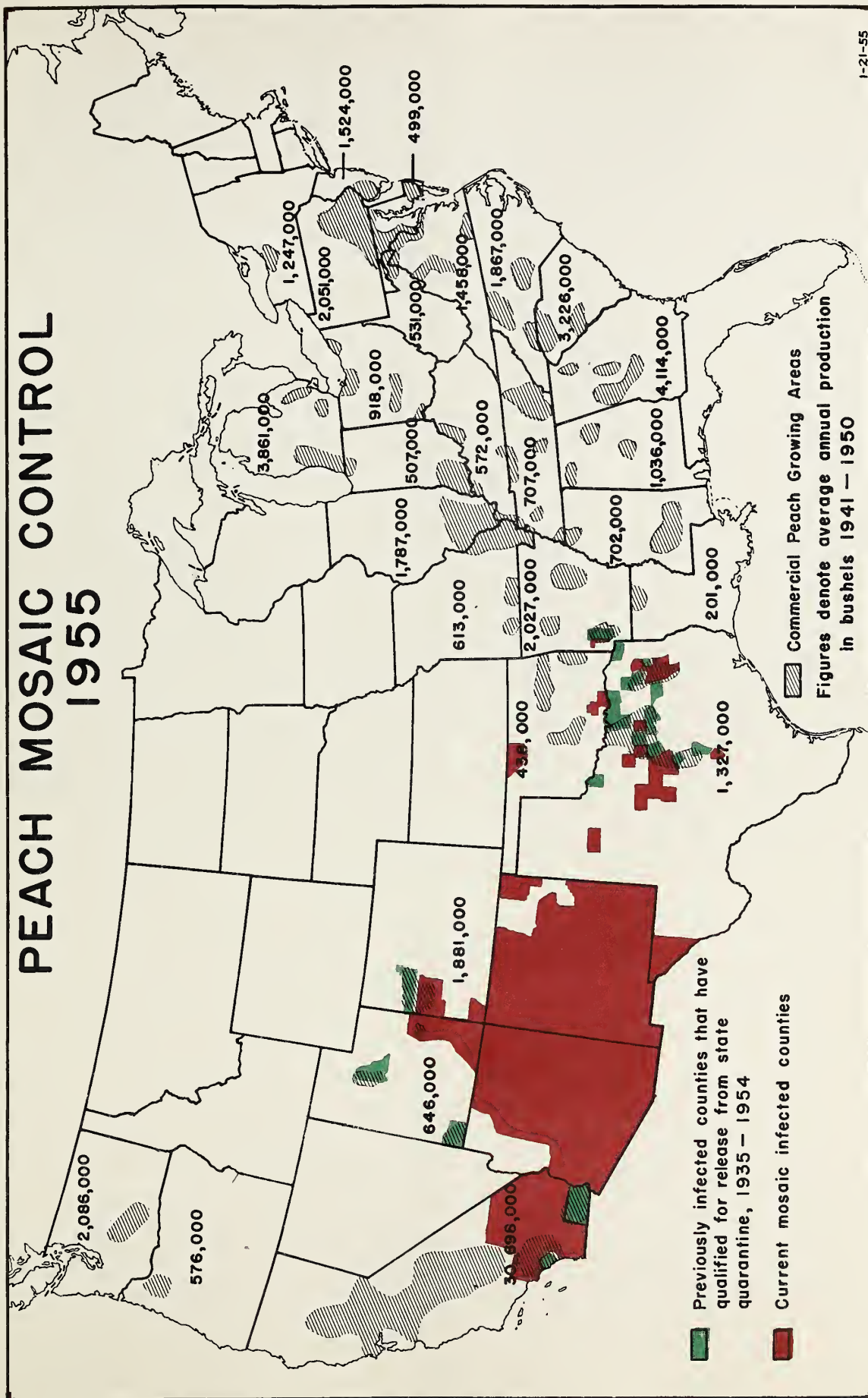


Figure 16

Legislature, the 19th State was added to the cooperative barberry eradication program. Work got underway in Kansas on July 1, 1955.

The States of Idaho and New York have also initiated some eradication work in localized areas with the technical assistance of Federal personnel. During the 12 months ending June 30, 1955, it was possible to reduce the eradication area in the 18 cooperating States by 20,000 square miles. A total of 4,500 previously infested properties were reworked. In all, 23,646,000 barberry bushes were destroyed.

Nurserymen and dealers throughout the country showed increased interest in the sale and distribution of true-to-type rust resistant species of barberry, Mahonia and Mahoberberis. In 1955, a new high of 435 nurserymen and 71 dealers requested inspection and approval of stock for interstate shipment. Through this rigid nursery sanitation program, susceptible varieties of these plants are eliminated from the trade to prevent reinfestation of territory where eradication work is underway. (See Figure 17).

8. Pink bollworm situation shows both favorable and unfavorable aspects. Results of the 1954 inspections and those for 1955 to November 5, indicate the spread of the pink bollworm has been slowed, there being less spread during this period than in any one year since 1949. Only three new counties were found infested in 1954, all in Arkansas, and the only new find outside the regulated area through October 12, 1955, occurred in Pointe Coupee Parish, Louisiana. Appropriate regulatory action has been taken. The 1955 inspections indicate a favorable situation in Arkansas and Louisiana but inspection of gin trash in Texas and Oklahoma shows a decided increase in degree of infestation in east-central Texas extending into a single county in Oklahoma. Pink bollworm injury in a number of places in south and central Texas has increased to commercial importance following two years of extremely light damage.

Field cleanup in south Texas was hampered during the 1955 season by heavy rains, where in some sections by the end of September as much as 26 inches had fallen. Many plants produced squares before the fields dried sufficiently to plow out the sprout cotton. More favorable conditions exist further north and good compliance to stalk destruction regulations is expected.

Additional emphasis has been placed in 1955 on vehicular traffic inspection to prevent migrant cottonpickers enroute from Texas to Mississippi, Louisiana, Arkansas and Missouri from transporting heavily infested seed cotton in pick sacks. Numerous interceptions of infested material have been made.

There was a 23 percent drop in wild cotton plants located and destroyed in Florida during fiscal year 1955, as compared with the previous year. Pink-bollworm infestations in wild cotton occurred

in 8 areas as compared with 29 in 1954. These decreases in the numbers of focal points from which the pink bollworm may spread northward and in the incidence of pink bollworm larvae promise additional protection to the cotton industry in the southeastern United States.

Figure 18 shows the pink bollworm quarantined and infested areas.

9. Rate of golden nematode spread on Long Island declines. Golden nematode surveys during calendar year 1955 revealed less newly infested acreage on Long Island than in any year since 1943. Only 5 new fields, totaling approximately 215 acres, were added, compared with more than 1,156 acres in 1953 and 409 in 1954. Since its initial discovery in the United States in 1941, the golden nematode has been found on approximately 12,700 acres on Long Island, of which about 8,560 have since been removed from agriculture by housing and industrial development. The remaining infested area, slightly more than 4,100 acres, is being withheld from potato and tomato production. During 1954 the State of New York assumed the entire responsibility for compensating owner-operators who retired infested land from potato production.

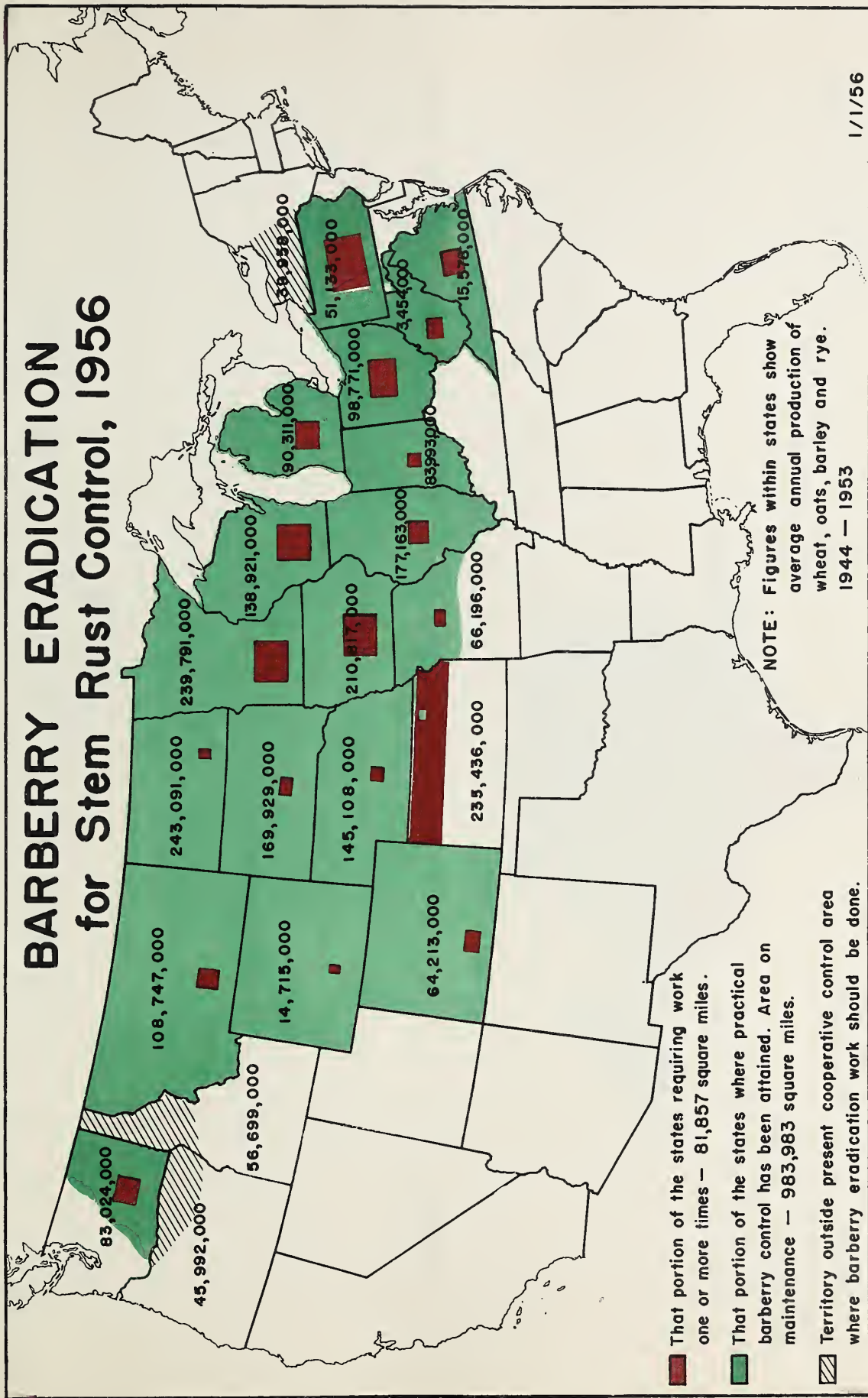
Surveys carried on during calendar year 1955 in the 7 States of North Dakota, South Dakota, Wisconsin, Michigan, Minnesota, New Jersey, and upstate New York, failed to turn up any nematode infestations except those on Long Island. During the course of this survey, soil samples were taken representing nearly 100,000 acres of potato land. Field and grader inspections outside Long Island are conducted throughout the potato producing areas of the United States on a three-year rotation so that corrective measures can be taken promptly in the event outlying golden nematode infestations are detected.

The New York State quarantine which regulates the movement of commodities capable of spreading the golden nematode was extended in 1954 to include all of the potato growing areas on Long Island. The order was further amended to require that all domestic movement of potatoes from the regulated area be packaged in paper as a further safeguard against spreading the golden nematode.

10. New white-fringed beetle control methods show promise as a means of eradicating known areas of infestation. The results obtained with recently approved methods of white-fringed beetle control in Mississippi, New Jersey, and elsewhere, are demonstrating their value as an eradication tool. In 1954, white-fringed beetles were found and treated at 35 localized spots in 6 Mississippi Delta Counties. A comprehensive survey conducted there in 1955 resulted in negative findings except in a single case.

As of September 30, 1955, a total of approximately 500,000 acres was classified as infested. These were distributed in 186 counties

BARBERRY ERADICATION for Stem Rust Control, 1956



NOTE: Figures within states show average annual production of wheat, oats, barley and rye. 1944 — 1953

1/1/56

Figure 17

PINK BOLLWORM CONTROL 1955

PINK BOLLWORM QUARANTINED AREA

- Lightly Infested
- Heavily Infested

Note: Figures in states indicate cotton production in bales - Dec. 1, 1954

State	Production (bales)	Infestation Level
Alabama	1,450,000	Lightly Infested
Georgia	1,800	Lightly Infested
Florida	850,000	Lightly Infested
South Carolina	310,000	Lightly Infested
North Carolina	295,000	Lightly Infested
Virginia	3,920,000	Lightly Infested
Tennessee	1,355,000	Lightly Infested
Mississippi	450,000	Lightly Infested
Alabama	2,600	Lightly Infested
Georgia	11,500	Lightly Infested
South Carolina	12,500	Lightly Infested
North Carolina	545,000	Lightly Infested
Virginia	360,000	Lightly Infested
West Virginia	500,000	Lightly Infested
Ohio	610,000	Lightly Infested
Pennsylvania	725,000	Lightly Infested
Delaware	11,575,000	Lightly Infested
Maryland	570,000	Lightly Infested
District of Columbia	25,300	Lightly Infested

PINK BOLLWORM QUARANTINED AREA

Note: Figures in states indicate cotton production in bales - Dec. 1, 1954

INFESTED AREA-
WILD COTTON

1-21-55

U. S. DEPARTMENT OF AGRICULTURE

Figure 18

in 8 Southeastern States and in New Jersey. There is a total of 150,000 acres on which no infestation has been found for 3 years or more as a result of control measures. Figure 19 shows all the areas of known infestation.

An infestation in sweetpotatoes involving an area of less than 100 acres was found in November 1954, in southern New Jersey. This area and a suitable barrier around it, which in all totaled about 360 acres, was promptly treated by the dieldrin method. It is believed that complete eradication of this outlying infestation will result.

11. New infestations of Hall scale found. On January 28, 1955, two new infestations of Hall scale were found in dooryard plantings in one city block at Chico, California. Intensive inspection of an area 2,500 feet in radius around these infested trees revealed 5,179 susceptible host plants growing within the 83 city blocks involved. Because of the lateness of the season when these new infestations were discovered, it was possible to fumigate only those trees in the infested block and those adjacent to it. Remaining susceptible hosts in the treatment area were immediately sprayed as a precautionary measure. Subsequently, 3,557 susceptible hosts were destroyed on 615 properties in the protective zone. There remain 1,622 hosts in the area that are scheduled for initial treatment this year.
12. Westward spread of gypsy moth cause for concern. Surveys in 1954 revealed spread to the west and south of previous infestations in southeastern New York. Trapping surveys in 1955 suggest that the barrier zone in eastern New York and western New England has been completely overrun and that spread has extended 50 miles beyond the 1953 southwestern periphery of infestation. If visual observations in late 1955 confirm the trapping surveys, about 8 to 9 million acres will have been added to the infested area in eastern New York and extending into northern New Jersey and northeastern Pennsylvania.

During the spring of 1955, nearly one million acres of woodland infested with gypsy moth were sprayed by Federal and State cooperators. Cooperating Federal and State agencies treated approximately 165,000 acres within and to the west of the barrier zone, where hazard of spread is the greatest. Federal personnel provided technical assistance to the States in the generally infested area, where more than 780,000 acres were treated. Massachusetts led the States by treating almost 700,000 acres to prevent serious damage to forest and recreational sites. Figure 20 shows the areas of infestation.

Residual points of infestation found as a result of trapping in the vicinity of Lansing, Michigan, in 1954, were sprayed in the spring of 1955. Several additional spots of infestation were found in the summer of 1955 beyond previously treated areas.

13. Grasshopper and Mormon cricket surveys guide control operations. Grasshopper adult and egg surveys made during the late summer and fall of 1955 will again provide the necessary advance information to farmers, ranchers, State, and Federal agencies to enable them to plan and carry out timely, economical, and effective control programs in 1956. The surveys indicated that there are some 18 million acres of rangeland included within infested areas in 15 Western States. This is about 12 million acres more than reported a year ago. The buildup has occurred principally in areas affected by drought during the past few years. Follow-up surveys will be made in the spring of 1956 immediately before the onset of control work to give the final index of grasshopper populations requiring control during the 1956 crop season on both crop and range lands. (See item under contingency fund for control operations on range lands).

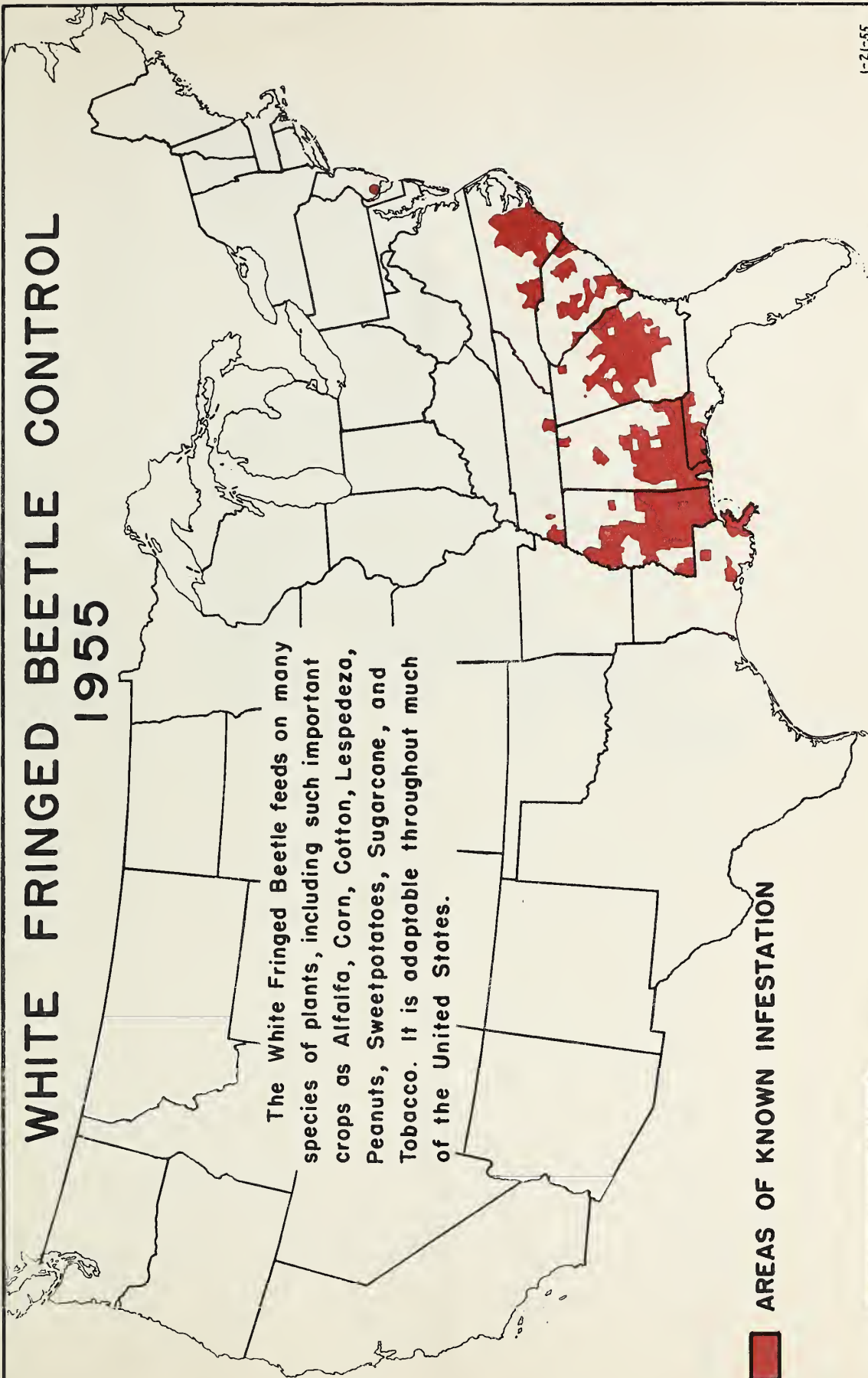
Federal personnel, in cooperation with the States, gave technical assistance in the control of grasshopper infestations occurring on crop lands. The actual cost of control on such lands is borne by farmers. Incomplete reports indicate that farmers applied control to several million acres of croplands in 1955 with satisfactory results where recommended procedures were followed.

14. Economic insect survey activities popular. Insect detection and reporting continues to be of paramount interest to agricultural workers throughout the country. A recent survey by one national pest control magazine discloses that the weekly insect report holds its top reader interest. Survey entomologists operating under joint Federal-State agreement were increased to 25 by October 1955. Cooperative reporting has increased noticeably in the States under agreement, and voluntary cooperation has shown an upward trend in all States. Weekly insect reports reflecting occurrence, outlook, and damage information were received from 47 States and several territories and possessions. Special effort was directed toward improved and standardized survey methods for countrywide use. Area supervisors have continued to assist State regulatory agencies with khapra beetle inspections at grain storage establishments receiving shipments from infested premises in other States. Special surveys, such as those for the beet leafhopper, potato leafhopper, potato psyllid, and boll weevil, are continuing in cooperation with various agricultural workers and groups.
15. Emergency outbreaks of insects and plant diseases (contingency fund). During 1955, \$650,300 was released from the contingency fund to enable the Department to participate in the following control programs: (1) Grasshoppers in 11 Western States, (2) Mexican fruit fly in northwestern Mexico, (3) khapra beetle in Arizona, California and New Mexico, (4) burrowing nematode in Florida, and (5) European chafer in New York, Connecticut, and West Virginia.

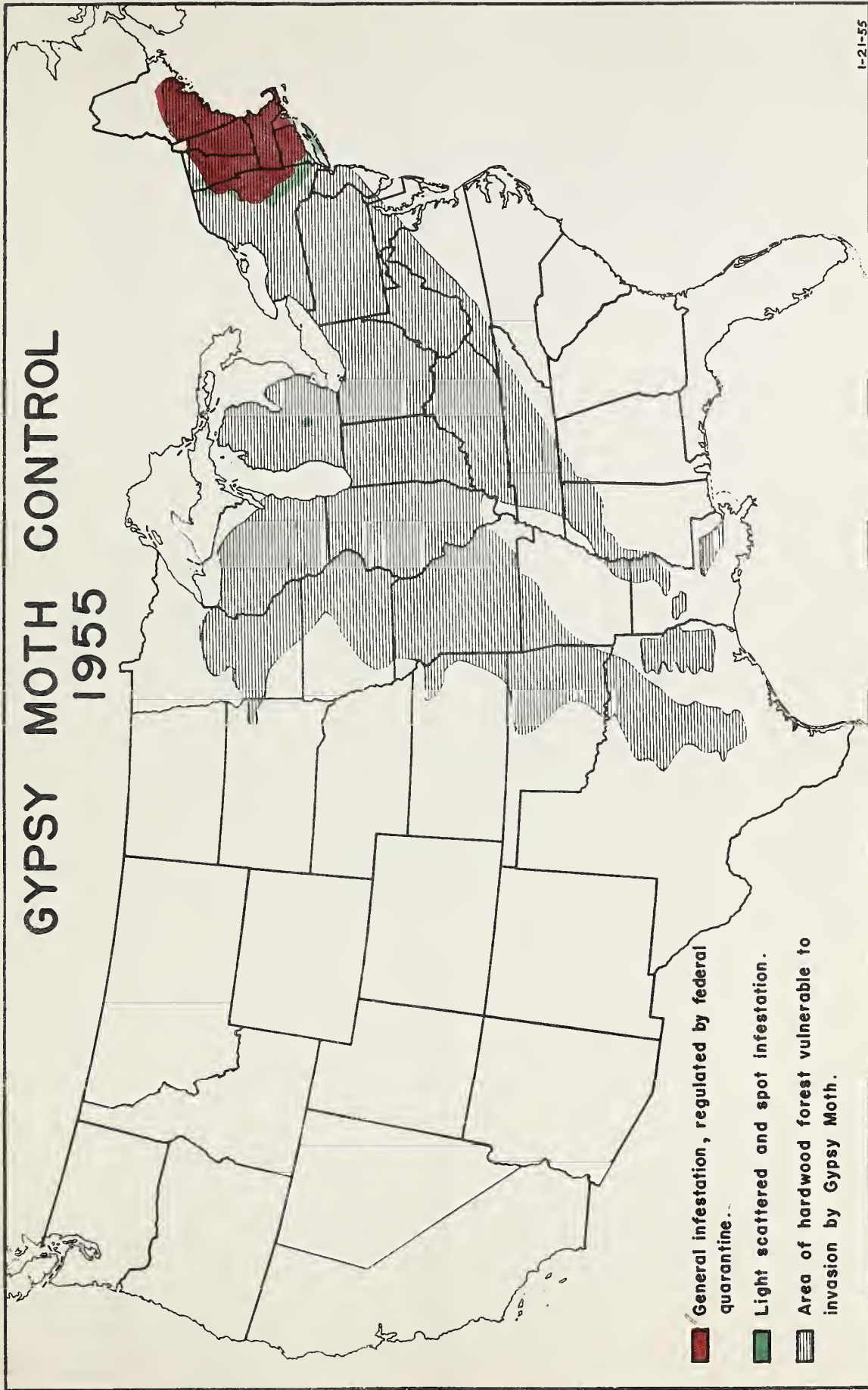
WHITE FRINGED BEETLE CONTROL 1955

The White Fringed Beetle feeds on many species of plants, including such important crops as Alfalfa, Corn, Cotton, Lespedeza, Peanuts, Sweetpotatoes, Sugarcane, and Tobacco. It is adaptable throughout much of the United States.

 AREAS OF KNOWN INFESTATION



GYPSY MOTH CONTROL 1955



1-21-55

- a. Grasshopper control operations on rangelands doubled in 1955. As a result of information gathered in the 1955 spring surveys conducted under regular funds, 1,648,178 acres of infested range lands were treated in the 1955 crop year as compared with 787,580 acres in 1954. These control operations are financed by releases from the contingency fund, only after approval by the Secretary of Agriculture and the Bureau of the Budget. The States and number of acres sprayed are approximately as follows:

<u>States</u>	<u>Numbers of Acres Sprayed</u>	
	<u>1954</u>	<u>1955</u>
Arizona	- -	73,383
Colorado	239,200	- -
Idaho	149,000	40,389
Montana	- -	34,978
Nevada	- -	10,220
New Mexico	119,000	458,003
Oklahoma	- -	148,239
Oregon	19,000	91,071
Texas	43,300	508,662
Utah	14,500	32,404
Washington	- -	49,950
Wyoming	<u>203,580</u>	<u>200,879</u>
Total.....	787,580	1,648,178

While conditions were extremely serious in many of the Western States, the most extensive and acute situations were encountered in large areas in the Panhandle of Texas and adjacent Oklahoma and New Mexico. Since July 1, 1955, a total of \$154,700 has been released from the contingency fund to take care of late season control work. Of the total acreage, 279,403 was Federal land. Non-federal cooperators contributed about \$480,000 of the cost of spraying on private and State lands. The area of infestation treated in the 1955 crop season is shown in Figure 21.

Survey information now available provides a forecast of the grasshopper outlook for 1956. It appears that a continuation of the threatening situation that has existed for the past three years in the Texas, New Mexico, Oklahoma, Kansas, and Colorado is likely and there has been a noticeable build-up in parts of Montana, Oregon, and California. It is expected that suppressive measures may also be needed in Arizona, Idaho, Nebraska, Utah, and Wyoming.

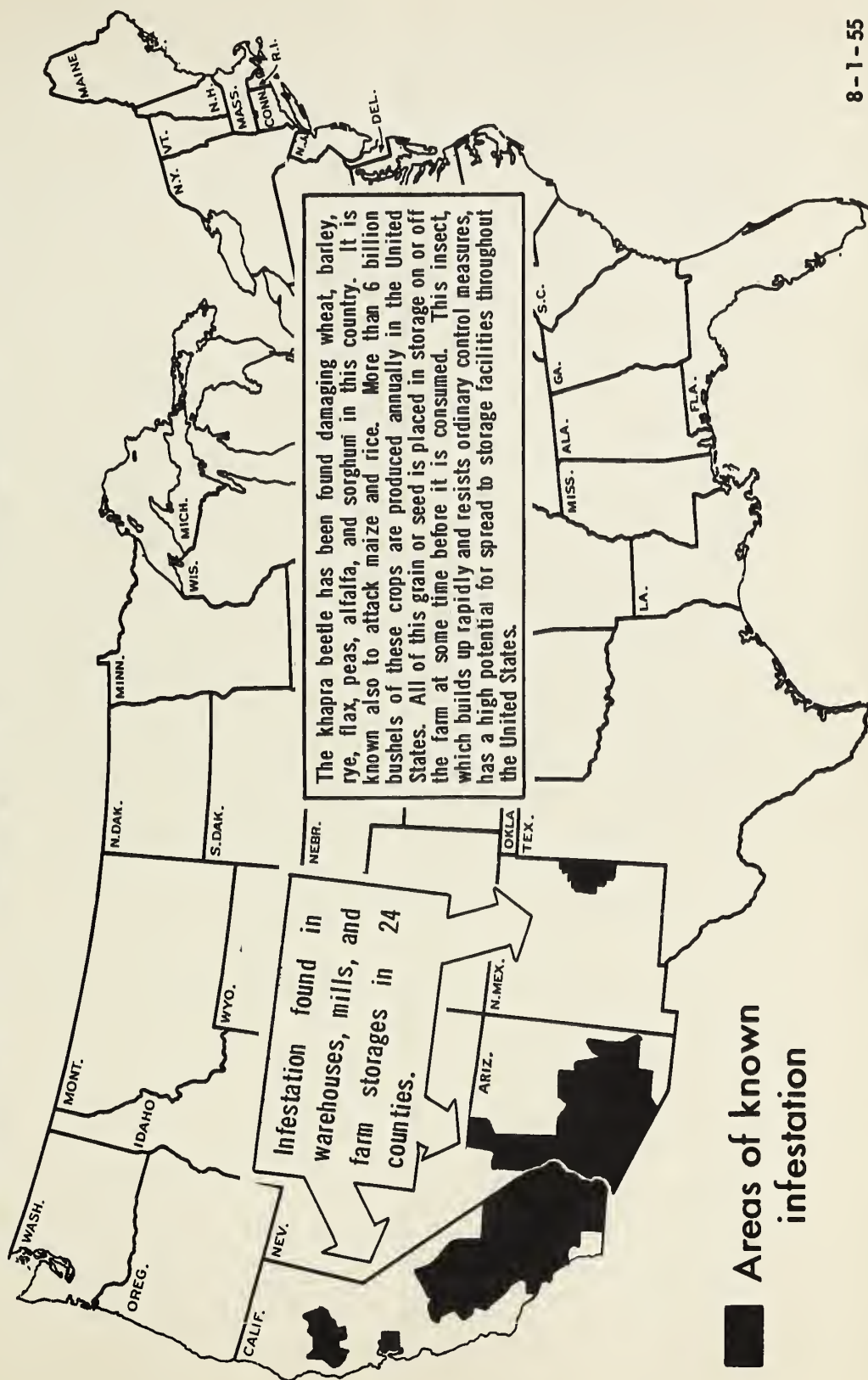
Mormon-cricket outbreaks given prompt attention. The recent Mormon-cricket outbreak in the Nevada-Utah-Idaho area, which reached its peak in 1953, appears to be progressively losing

intensity. During 1955, the cooperatively conducted control operations treated 84,529 acres for Mormon-crickets in six western States as compared with 121,500 acres in 1954. This work was largely of a clean-up nature, and the outlook in this area for 1956 is good. However, conditions are more threatening in the Montana-Wyoming area for the 1956 crop year. The 1955 acreage treated was distributed approximately as follows:

<u>States</u>	<u>Acreage</u>	<u>States</u>	<u>Acreage</u>
Colorado	6,052	Nevada	3,000
Idaho	715	Utah	15,182
Montana	52,983	Wyoming	6,597

- b. Eradication of Mexican fruit fly in southern California and northern Baja California, Mexico, is meeting with success. The continuing spray program conducted in the Far West, in cooperation with the Mexican and California Departments of Agriculture and others, appears to be effective. Adults were trapped with considerable regularity throughout the summer and fall of 1954. From November 1954 until August 18, 1955, no flies were trapped, but in late summer 1955 single flies were taken on two different properties in the seaport town of Ensenada some 85 miles from the border and in the village of Tecate about 25 miles east of Tijuana. These infestations appear to be new ones. Bait sprays are being applied at Tecate and Ensenada with the objective of eradication. It is presumed these infestations in northwestern Mexico came about through the importation of infested fruit from the interior. To keep this situation from recurring, the cooperative inspection and fruit treatment program in Mexico has been strengthened. Fruit moving from the interior of Mexico to border cities is treated at strategically located fumigation stations operated in cooperation with Mexican officials. There has been released \$67,000 from the contingency fund for use during the first six months of fiscal year 1956 and it is estimated that the Mexican cooperators, the States of Arizona and California, and the 5 interested counties in California will contribute in excess of \$80,000 toward continuance of the program.
- c. Federal khapra beetle control program accelerated. On February 21, 1955, a Federal quarantine regulating the movement of commodities capable of spreading the khapra beetle was approved. While the entire States of Arizona, California, and New Mexico were placed under quarantine, the regulated areas actually involve only the individual establishments where infestation is found. (See Figure 22). Since discovery of the beetle in November 1953, a large number of properties have been inspected by State and Federal officials, including some in many States

KHAPRA BEETLE CONTROL, 1955



8-1-55

Figure 22

not under quarantine. During the first ten months of calendar year 1955, more than 22,000 properties in the three infested States, and over 800 in 20 other States, were examined. As of November 10, 1955, 296 infestations have been found, distributed as follows: Arizona, 78; California, 214; and New Mexico, 4.

As a result of investigations conducted in cooperation with the California State Department of Agriculture, it has been found that the khapra beetle can be exterminated in warehouses and the infested properties released from regulation. A procedure was developed whereby entire warehouse structures - which sometimes contain more than a million cubic feet of space and are seldom if ever gastight - can be covered with plastic tarpaulins and successfully fumigated with heavy dosages of methyl bromide. Following fumigation with 5 pounds of methyl bromide per 1,000 cubic feet, they are eligible for release from quarantine regulations. As of November 10, 1955, a total of 107 infested properties have been successfully fumigated and released from quarantine regulations. The program provides for the treatment of all the currently known infestations during the next 12 to 18 months.

To cover the Federal cost of this program for the first 6 months of fiscal year 1956, \$266,000 has been released from the contingency fund of which fumigation work will require approximately \$166,000, and quarantine enforcement and survey about \$100,000. State and private industry meet approximately two-thirds of the costs of fumigation.

- d. Burrowing nematode causes serious concern in Florida citrus areas. For a number of years citrus groves in the central ridge area of Florida have suffered severely from a condition known as "spreading decline." Each year an increasing number of trees were affected by this malady, which results in their rapid deterioration to a point where they are no longer productive. It was not until recently, however, that the burrowing nematode was implicated as the cause of this condition.

The Department made \$35,000 available in fiscal year 1955, and \$78,000 for part of the fiscal year 1956 from the contingency fund to cooperate with the Florida State Plant Board in conducting surveys to determine the distribution of this nematode. Federal crews operated principally outside of the area known to be generally infested and in nurseries where a hazard of spread exists through the shipment of nursery stock. For the 9-month period ending November 5, 1955, nearly 26,000 root samples have been examined, representing approximately 51,500 acres. Surveys were conducted in 1,649 citrus groves, 113 avocado groves, 509 nursery establishments, and many dooryard and miscellaneous plantings in 29 Florida counties. Infestation was found on 164 properties in 24 counties. As a result of this survey, it has been estimated that more than 6,000 acres of citrus are involved.

The most effective control remedy known at present requires removal of infested trees within a grove, including those in a protective border, followed by a soil application of a nematocide. The Florida Legislature has provided an appropriation of \$1,750,000 for the 1955-56 biennium to carry out a research and control program.

- e. Federal quarantine on European chafer issued. On March 10, 1955, a public hearing was held in Pittsburgh, Penn. to receive testimony relative to the need for a Federal quarantine on account of the European chafer. After a thorough study of the testimony, a Federal quarantine against the States of Connecticut, New York, and West Virginia became effective September 1, 1955. This quarantine regulates the interstate movement of certain commodities, such as soil, sand, gravel, certain plants, nursery stock, and other commodities and conveyances, that might spread this pest to new areas.

Surveys conducted during the summer of 1955 have revealed no new infestations at locations outside the generally infested area. Traps were placed in the District of Columbia and in Connecticut, Indiana, Kentucky, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Ohio, Rhode Island, South Carolina, Vermont, Virginia, and West Virginia. Some slight extensions of existing infestations, however, were recorded. The extensive cooperative treatment program is progressing satisfactorily at locations where the European chafer was found for the first time during 1954. The Department made available \$50,000 from the contingency fund in fiscal year 1955, and \$83,000 for fiscal year 1956. It is expected that cooperating States and industry will provide approximately \$150,000 toward the total cost of the program.

- f. Soybean nematode being closely watched. In August 1954, an unknown cyst-forming nematode was observed causing severe damage to soybeans in the Castle Hayne area of New Hanover County, North Carolina. Nematologists determined it to be the soybean nematode, which heretofore had been recorded as occurring in Japan and Manchuria. Only a limited amount of information is yet available concerning its biology and destructiveness, but preliminary studies indicate that it behaves much the same as the golden nematode of potatoes and may prove equally as difficult to control.

In the United States this nematode has been observed attacking soybeans and snap beans. At present, it is thought to be confined to about 1,000 acres in southeastern North Carolina. Surveys are now being conducted outside of the known area of infestation in North Carolina and in many of the other soybean States to determine if this pest has spread to other locations.

Considerable concern has been expressed over the possibility of this pest becoming established in the soybean producing areas of the United States. (See Figure 23). The State of North Carolina plans to issue a quarantine on January 1, 1956, to regulate movement of commodities which might carry the pest to other soybean producing areas.

16. Insecticide, Fungicide, and Rodenticide Act.

- a. Responsibilities under Federal Food, Drug and Cosmetic Act assigned to Agriculture. The Department of Agriculture has been assigned certain responsibilities in the enforcement of the Miller Amendment (Public Law 518) to the Federal Food, Drug and Cosmetic Act. The purpose of this amendment, enacted July 22, 1954, is to improve the procedure for regulating the amount of pesticide residues on raw agricultural commodities in interstate commerce. The responsibility of Agriculture includes the certification to the Department of Health, Education and Welfare that a pesticide chemical, being considered for a tolerance or exemption, is useful for the purpose intended. The Department of Agriculture also submits an opinion whether the proposed tolerance or exemption reflects the amount of residue likely to result.

At the end of fiscal year 1955, petitions for tolerances for 18 pesticide chemicals had been received and 11 certifications issued. A review of the registered labeling for more than 90 pesticide chemicals indicated there were 46 likely to leave residues in or on raw agricultural commodities, for which petitions have not been submitted and for which tolerances or exemptions from tolerances would be required under the provisions of the Miller Pesticide Amendment.

- b. Registration activities increase. There was a further increase in the registration of pesticides under the Federal Insecticide, Fungicide, and Rodenticide Act, both in the number of new labels submitted and in the number of amended labels proposed. In fiscal year 1955, 4,300 new products were registered as against 4,002 in the previous year. Similarly, 3,615 amended labels were accepted, an increase of 487 over the preceding year. The number of experimental permits issued (82) is about the same as last year. Four permit requests were reviewed and permits issued subject to the securing of a temporary tolerance as provided in the Miller Pesticide Amendment.

Holders of registrations issued during the 1950 fiscal year were notified that their registrations had expired. Many of the firms are no longer in business, and a total of 5,421 registrations have been cancelled.

The following table summarizes the registration activities:

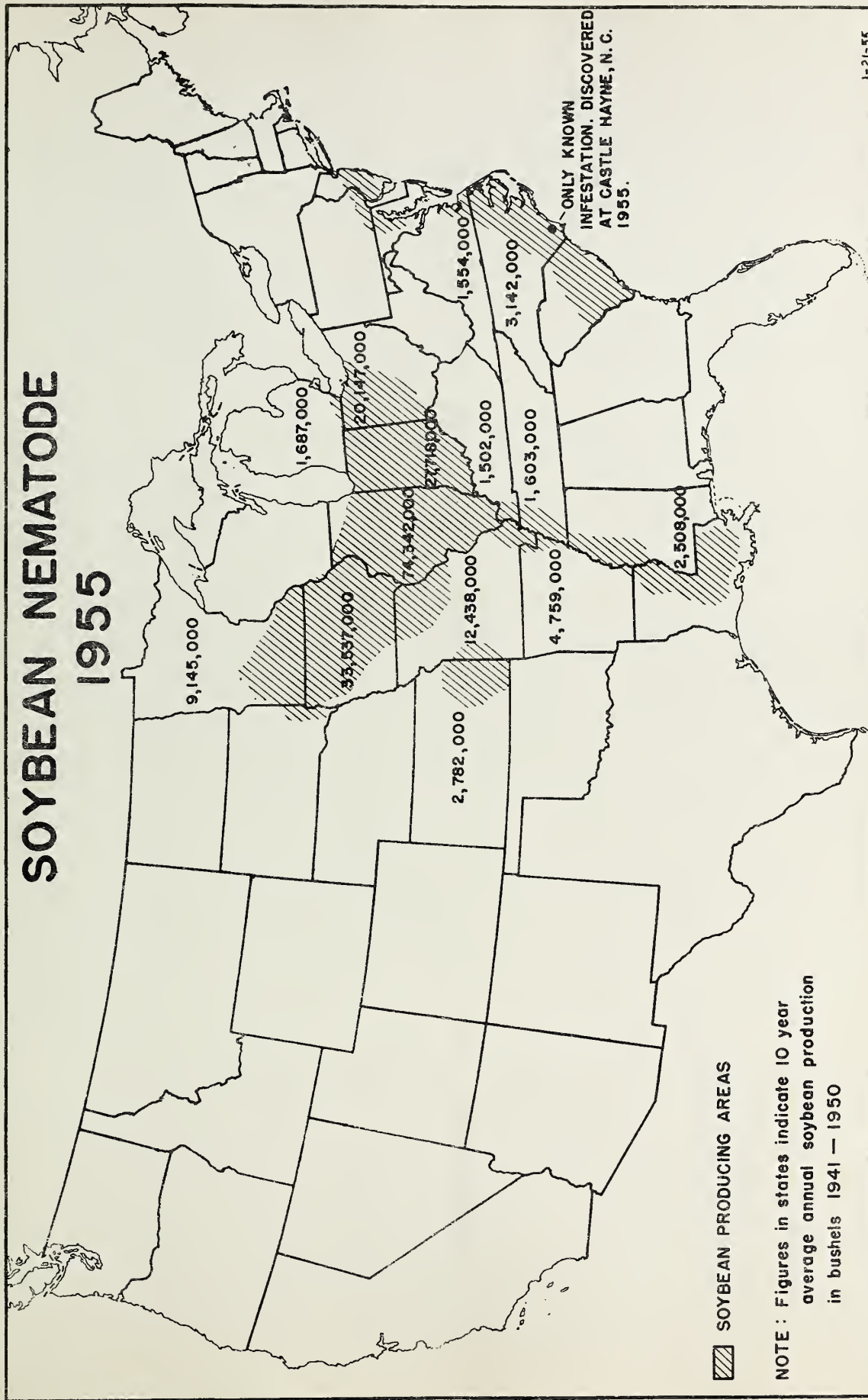
Registration Activities

Activity	1951	1952	1953	1954	1955	(Est.) 1956	(Est.) 1957
Submissions received <u>1</u> /.....	16,609	17,275	19,906	21,098	16,917	19,000	19,000
Carryover from previous year	378	269	394	435	311	400	400
Total submission requiring action..	16,987	17,544	20,300	21,533	17,228	19,400	19,400
<u>Registrations:</u>							
Original registrations	3,422	2,761	3,536	4,002	4,300	4,500	4,500
Supplemental registrations	3,569	4,853	5,325	7,419	3,202	5,000	5,000
Total registrations	6,991	7,614	8,861	11,421	7,502	9,500	9,500
Registration Correspondence <u>2</u> /	13,804	14,721	17,086	18,208	17,915	18,000	18,000
Pending at end of year	269	394	591	304	311	300	300

1/ Includes original submission, submissions of corrected labeling and supplemental submissions in instances where the originally registered products were in some manner changed after registration.

2/ Previously designated as "Letters of Criticism Written."

SOYBEAN NEMATODE 1955



1-21-55

Figure 23

- c. Numerous violations discovered. A total of 1,547 pesticide chemicals were examined during the year, with special attention being given to insect-repellent candles, lindane vaporizers, new anti-coagulant rodenticides, and certain household uses of the organic phosphate insecticides. Samples from 259 shipments (17%) were found to be seriously misbranded, adulterated, or otherwise in violation of the Act. Seizure action was initiated on 23 of these shipments.

Cooperation between Federal and State enforcement and research personnel has been improved and expanded. Various State and industry laboratories have cooperated with the Department in the development of new methods for the analysis and testing of pesticide chemicals. The following table summarizes the enforcement activities:

Summary of Enforcement Activities

Activity	1951	1952	1953	1954	1955	(Est.) 1956	(Est.) 1957
Samples Examined:							
Not previously sampled	1,212	1,034	1,132	1,134	960	975	975
Old products	850	1,051	1,178	667	587	625	625
	2,062	2,085	2,310	1,801	1,547	1,600	1,600
Violations (Misbranded and/or adulterated products)	560	572	454	411	395	400	400
Actions taken on violations:							
Warnings	116	102	113	125	113	130	130
Citations	413	399	291	242	259	250	250
Seizures	54	71	51	44	23	20	20
Prosecutions	20	10	5	5	19	5	5

Plant Quarantine:

1. Threat from foreign pests more serious. The substantial increase during fiscal year 1955 of foreign travel by plane, vessel, and automobile greatly magnified the danger of destructive foreign plant pests gaining entrance to the United States. Foreign travelers and their baggage are the source of most of the prohibited plant material and plant pests intercepted at U. S. borders. Commercial importations of plant material and other products known to carry harmful pests remained at a high level, as did shipments inspected and certified for exportation. The following comparative work-load figures for the last three fiscal years illustrate current trends in some of the more important plant quarantine activities:

Workload Data Fiscal Years 1954 through 1956

Item	F.Y. 1954	F.Y. 1955	F.Y. 1956 (Estimated)
<u>Inspection:</u>			
Airplanes, approximately 34% carrying unauthorized plant material in 1954 and 1955	77,029	89,205	91,000
Vessels, approximately 30% carrying unauthorized material	52,311	48,205	53,000
Cargo importations of plant material, under permit	69,317	68,586	70,000
Shipments of plant and plant products, inspected or treated, and certified for movement from Hawaii and Puerto Rico to the mainland	16,100	13,975	16,000
Containers of cut flowers and leis for movement from Hawaii to the mainland	488,849	457,283	475,000
Containers, plant material treated or cleaned	827,656	1,147,308	1,150,000
Freight cars from Mexico	81,481	85,768	87,000
Foreign mail packages	3,949,054	3,253,591	3,700,000
In cooperation with Customs:			
Vehicles from Mexico	14,367,598	15,240,649	16,000,000
Baggage, airborne, pieces of	2,275,514	4,592,254	6,000,000
Baggage with surface-borne passengers from Mexico	3,664,803	4,107,413	4,500,000
Baggage with ships' passengers, number of passengers	1,169,801	1,264,002	1,300,000
<u>Interceptions:</u>			
Unauthorized plant material, all sources	170,603	216,066	240,000
Lots of insects and plant diseases of plant quarantine significance, all sources	15,904	18,504	19,000
<u>Export certification:</u>			
Containers of domestic plants and plant products exported	11,850,609	12,688,479	13,200,000
Export certificates issued	33,476	34,784	36,000

2. Plant pests intercepted. During the fiscal year 1955, inspectors at ports of entry intercepted 18,504 lots of injurious pests from material arriving in airplanes, ships, trains, automobiles, cargo, mail, and passengers' baggage. The European corn borer is one example of an introduced foreign pest. In 1954 alone, it is estimated to have cost American farmers approximately \$260,000,000. The insects, plant diseases, mites, and snails intercepted include many of the world's most destructive plant pests. Among them were serious pests of wheat, corn and related plants, citrus, stone fruits, grapes, potatoes, sugarcane, cotton, and other important crops.
3. Risk of khapra beetle accompanying imports studied. An extensive study was made during the year to determine the risk of the khapra beetle accompanying importations. Careful examinations were made of a wide variety of products, some of which are not presently under plant quarantine restriction but have been reported as hosts of the beetle. Steps were taken to safeguard shipments suspected of harboring the insect. As a result of the discovery of the khapra beetle in Mexicali, B. C., Mexico, fumigation was required as a condition of entry for grain imported from infested premises. Inspectors at all ports are continuing to be on the alert for the arrival of the pest with imports.
4. New threat from Mediterranean fruit fly. Fruit and vegetable growers were faced with a new serious threat when the Mediterranean fruit fly was recently discovered in Costa Rica. This represents the first appearance of that pest in the western hemisphere north of Brazil since it was eradicated in Florida some 25 years ago. Provision for the entry of host products of the Mediterranean fruit fly from Costa Rica was promptly withdrawn, and inspectors were alerted to be on the lookout for infested material arriving in passengers' baggage from that country. Because of the added danger of the pest spreading to the United States if it should become established in Mexico, agricultural officials of that country were also promptly advised of the infestation and took immediate quarantine action to prohibit the entry of host materials into Mexico from Costa Rica. Arrangements have been made for an inspector of the Agricultural Research Service to train Mexican agricultural inspectors in airplane inspection at the Mexico City airport as a further safeguard against the northern spread of the pest.
5. Serious plant quarantine problem created by importation of plant material to feed monkeys imported for production of polio vaccine. Air cargoes of monkeys imported for use in producing polio vaccine have become an increasing problem. Plant products prohibited entry because of pest risk are carried as food for the monkeys, necessitating the cleaning of planes and destruction of the residue food. Until recently, shipments have arrived at ports where plant quarantine inspectors were regularly stationed. In order to expedite handling, however, a request was received for permission to land at an inland point where plant quarantine service was not available. Through the cooperation of the Animal Inspection and Quarantine Branch, arrangements were made for representatives of that Branch to supervise the destruction of residue food carried for the monkeys, thus facilitating the program without relaxing safeguards.

6. Threat of pests entering in passengers' baggage continues to be serious. A cooperative study made at New York during the year by the Bureau of Customs, and the Agricultural Research Service, indicated that less than half of the contraband plant material and only about one sixth of the plant pests arriving in passengers' baggage at that port are being intercepted under the recently revised Customs' inspection methods. Observations at other ports also show that plant materials, as well as the pests infesting them, are escaping detection in baggage as a result of present inadequate inspection. While baggage inspection is primarily a Customs' responsibility, arrangements were made during the year for plant quarantine inspectors to give as much surveillance as possible to this activity. On the Mexican border, and at other ports where conditions made the procedure practicable, plant quarantine inspectors were designated as Customs officers and can now participate more fully in baggage inspection.
7. Program adjustments made to insure maximum utilization of personnel and facilities. The steady increase of foreign travel and trade, without a corresponding increase in manpower for plant quarantine inspection, necessitated a continued careful appraisal of the work and adjustments to cover activities where the threat of pest entry was found to be most critical. Two ports were closed and the personnel shifted to more important ports. Plant quarantine activities in Puerto Rico and the Virgin Islands were placed under the supervision of the Gulf area supervisor, resulting in better coordination of the work and more adequate surveillance of activities at these two points. Mexican border ports in California were strengthened to provide additional protection against the entry of the Mexican fruit fly, the khapra beetle, and other pests.

Additional modifications in the program were made to take care of shifts in traffic patterns. The Military Air Transport Service moved its base of operations from Westover Field, Mass., to McGuire Field, N.J., necessitating a corresponding shift in personnel. MATS is also using Charleston, S.C., as a base for cargo flights and has been bringing in dirt moving equipment by air. The risk of the golden nematode and other pests accompanying this equipment has required additional plant quarantine surveillance.

Added emphasis was placed on in-service training in plant quarantine enforcement, to increase the effectiveness of personnel in carrying out plant quarantine duties. An experienced inspector, also trained as a Deputy Collector of Customs, participated in a cooperative training program with MATS in Japan relating to the 4,000 troops being rotated by air to the mainland, which enables the Department to maintain better plant quarantine at a substantial savings in inspector man hours at Honolulu. This arrangement is also more satisfactory to the Air Force because of reduced crew fatigue and cost and greater safety to personnel by reason of elimination of off-loading of personal effects for inspection in Honolulu during the crew-rest period. Plans are being made to follow this same procedure with future operations of this kind.

8. Use of additional funds made available for plant quarantine enforcement in F.Y. 1956. The increase of \$308,700 provided in 1956 for this work

is being used to add 40 inspectors at ports where the threat of pest entry is greatest. In selecting the ports at which the new inspectors will be stationed, particular attention is being given to the need for stronger defenses against the khapra beetle, the Mexican fruit fly, the Mediterranean fruit fly (which now also threatens from Central America) the golden nematode, the oriental fruit fly, the melon fly, the citrus black fly, citrus canker, and other destructive pests deemed to represent the greatest danger to our agriculture.

9. Steps taken to increase effectiveness of inspection staff. A new recruitment and training program for plant quarantine inspectors was recently set up which will materially increase the efficiency of the inspection staff as a whole. The new procedure should make the position more attractive to qualified men just out of college. More important, however, it will result in a better trained, more efficient inspection staff and hence will result in better protection to U. S. agriculture against foreign plant pests.

ANIMAL DISEASE AND PEST CONTROL

Current activities: Measures are devised to exclude from this country communicable diseases of foreign origin; to prevent the spread of diseases through interstate shipments of livestock or distribution of impure or impotent veterinary biologics; to control and eradicate livestock diseases; and to maintain, through a marketing agreement with manufacturers and handlers, adequate supplies of hog cholera virus, serum and vaccine for protection of swine.

Selected Examples of Recent Progress:

Animal Disease Control and Eradication.

1. Tuberculosis Eradication Moves Ahead.

- a. The incidence of tuberculosis in cattle during fiscal year 1955 was 0.12 percent compared with 0.11 percent in fiscal year 1954. There was a continued gradual reduction in the percentage of carcasses found with tuberculosis (not including reactors) in Federally inspected slaughtering establishments as compared with previous years.
- b. Continued efforts have been made to trace to the herds of origin animals that show lesions of tuberculosis in slaughtering departments of Federally inspected plants. During the fiscal year 1955, 1,537 reactors were disclosed as a result of this tracing procedure compared with 1,613 during fiscal year 1954. These reactors were disclosed as a result of testing 27,354 animals included in the exposed herds. This method of tracing infection has proved a valuable adjunct to field testing and is being developed to the utmost.
- c. One of the main difficulties in connection with tracing to the herd of origin animals showing lesions of tuberculosis in slaughtering plants is proper identification from the time the animal leaves the farm until it is slaughtered. In cooperation with the State of New York, a pilot operation was established at the Buffalo stockyards to improve animal identification. Instructions for the use of special identification tags are provided the owner and/or trucker and each broker or dealer through which the animal may pass prior to slaughter. The success of this project and its expansion to other yards would greatly improve the tracing procedure.
- d. Many students graduating from veterinary schools and practicing veterinarians have never had the opportunity to observe a tuberculin reaction. Arrangements were made at most of the veterinary colleges in this country to have a number of cattle injected with killed cultures of the tuberculosis organism. After allowing about 30 days for the animals to become sensitive, they were injected with tuberculin, and demonstrations showing tuberculin reactions were held for the benefit of the graduating classes.

In many cases practitioners in the State were invited to observe the reactions. Many favorable comments were received from those attending.

A series of slides showing reactions to the tuberculosis test and the various lesions found in tuberculosis animals has been prepared. Because of the lack of practical experience among many practicing veterinarians, it is believed that this educational material will improve testing techniques and general eradication procedures.

- e. Comparison of funds provided by the Federal Government and cooperating States and counties for the eradication of tuberculosis for the fiscal year 1956 is as follows:

TUBERCULOSIS

	<u>Federal Government</u>	<u>Cooperators</u>
Operating funds	\$1,798,800	4,125,359
Indemnity payments	<u>280,000</u>	<u>989,300</u>
Total	2,078,800	5,114,659

- f. The following tables show the average State and Federal indemnity payments and other data pertaining to the program for control and eradication of tuberculosis.

2. Brucellosis Eradication Accelerated.

Stimulation of the brucellosis eradication program resulting from funds provided by Public Law 690 approved August 28, 1954, resulted in greater progress during the past fiscal year on this project. Progress made during the last half of the fiscal year was particularly noteworthy. A number of charts are included which show the progress in the program. Statistics covering the period January through June, 1954, and January through June, 1955 follow:

	<u>Jan. to June 1954</u>	<u>Jan. to June 1955</u>
Estimated cattle milk or cream tested	9,075,711	11,701,204
Cattle blood tested for brucellosis	4,962,708	8,950,489
Reactors found	122,769	238,349
Percentage of infection (reaction to blood test)	2.5	2.7
Reactors slaughtered	63,630	179,521
Calves vaccinated	2,357,844	2,677,893
Certified brucellosis-free herds	63,117	71,606
Modified certified brucellosis-free areas	334	379

	<u>June 1954</u>	<u>June 1955</u>
Herds under supervision	2,298,284	2,585,277
Cattle under supervision	24,572,013	31,948,708

The additional funds made it possible to expand all phases of the program. Most of this service was performed by practicing veterinarians working on a part-time basis, and who were compensated on a "per head" fee basis.

In areas where veterinary personnel are not available, the use of technicians working under veterinary supervision has been increased.

- a. The use of the milk test as a screening device for locating brucellosis infected herds was increased during fiscal year 1955. A comparison with fiscal year 1954 follows.

	<u>F. Y. 1954</u>	<u>F. Y. 1955</u>
Herds tested	932,003	1,200,898
Cattle tested	16,633,034	20,444,994
Percent of herds classified as negative	73.9	76.8

The milk test was used in 35 states and Puerto Rico, 7 more states than in fiscal year 1954, with the greatest advantage

STATEMENT OF COMPARATIVE TESTING, HERDS AND CATTLE UNDER SUPERVISION, MODIFIED ACCREDITED AREAS
AVERAGE APPRAISAL, SALVAGE, AND STATE AND FEDERAL INDEMNITY IN TUBERCULOSIS ERADICATION WORK
FISCAL YEAR 1935 TO 1955 INCLUSIVE

Fiscal Year	Tests Conducted		Reactors found	Per- cent infect- ion	Under Supervision		Modi- fied accredi- ted areas*	Average during year		Federal Indemnity
	Herds	Cattle			Herds	Cattle		Apprai- sal	Salvage	
1935	2,378,668	25,237,532	376,623	1.5	6,590,863	48,768,627	2,428	\$57.55	\$15.19	\$18.70
1936	1,944,624	22,918,038	165,496	.7	6,515,273	59,907,935	2,921	77.66	26.50	22.44
1937	961,109	13,750,308	94,104	.7	6,745,471	61,640,711	3,030	86.04	28.94	22.72
1938	1,007,586	14,108,871	89,359	.6	6,471,538	62,640,358	3,124	86.76	32.16	18.12
1939	750,806	11,186,805	60,338	.5	6,372,720	60,439,030	3,142	89.01	34.49	15.97
1940	819,408	12,222,318	56,343	.46	6,191,330	61,570,426	3,148	91.05	37.12	16.20
1941	777,435	12,229,499	40,702	.3	6,235,198	62,696,167	3,151	96.50	40.99	16.48
1942	681,504	10,983,086	28,008	.26	6,320,006	63,073,213	3,151	109.69	50.35	16.55
1943	563,413	9,308,936	17,167	.18	6,317,670	63,846,496	3,151	135.19	65.03	18.75
1944	524,927	8,894,466	18,338	.2	6,153,069	64,519,652	3,151	154.53	59.93	21.72
1945	484,749	8,105,480	19,534	.24	6,120,528	64,790,921	3,151	161.32	59.78	22.71
1946	505,296	8,454,463	19,464	.23	6,035,783	65,981,099	3,150**	174.20	69.00	23.89
1947	515,517	8,312,919	16,666	.2	6,082,666	65,577,421	3,150	199.46	83.55	24.19
1948	523,924	8,294,423	15,943	.19	6,044,170	66,246,215	3,150	234.60	119.74	23.90
1949	536,162	8,737,501	17,007	.19	5,985,215	65,419,332	3,150	285.78	139.46	24.72
1950	539,799	9,439,811	17,733	.19	5,991,703	65,443,353	3,150	272.87	123.24	25.05
1951	503,933	8,847,228	12,353	.14	5,808,062	64,824,960	3,149***	323.70	174.64	24.92
1952	488,769	9,164,265	10,351	.11	5,798,865	64,791,861	3,149	346.13	174.05	25.66
1953	463,159	9,675,245	10,811	.11	5,688,183	67,423,940	3,149	309.47	117.31	26.12
1954	478,975	10,234,665	10,886	.11	5,681,947	67,937,276	3,149	250.92	82.18	26.60
1955	417,683	9,210,810	11,133	.12	4,669,733	79,567,058	3,149	235.10	77.63	25.28

* Includes Puerto Rico and the Virgin Islands.

** Reduction is due to consolidation of two counties.

*** Reduction is due to fact no cattle under supervision in District of Columbia.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
ANIMAL DISEASE ERADICATION BRANCH

SUMMARY OF BOVINE TUBERCULOSIS ERADICATION IN COOPERATION WITH THE VARIOUS STATES

FISCAL YEAR 1955

STATE	Herds tested	Cattle tested	Infected premises	Percent Infected	Reactors found	Percent reactors
Connecticut	6,988	170,504	64	0.9	252	0.15
Maine	8,529	96,726	5	0.06	6	0.006
Massachusetts	10,531	197,579	29	0.28	62	0.03
New Hampshire	6,874	104,006	2	0.03	2	0.002
New York	41,795	1,282,088	341	0.8	1,113	0.09
Rhode Island	1,512	27,315	41	2.7	68	0.25
Vermont	6,323	189,845	22	0.35	171	0.09
TOTALS AREA 1	82,552	2,068,063	504	0.6	1,674	0.08
Delaware	2,080	48,043	40	1.9	78	0.16
Kentucky	1,851	33,804	21	1.1	42	0.12
Maryland	10,903	258,011	96	0.9	199	0.08
New Jersey	8,733	228,331	171	2.0	241	0.11
Pennsylvania	37,649	687,601	235	0.6	833	0.12
Virginia	8,384	215,030	43	0.5	56	0.020
West Virginia	2,376	49,350	40	1.7	109	0.22
TOTALS AREA 2	71,976	1,520,170	646	0.9	1,558	0.1
Illinois	20,464	386,644	332	1.6	540	0.14
Indiana	10,078	196,971	275	2.7	674	0.34
Michigan	14,671	258,695	759	5.2	1,465	0.57
Ohio	21,625	319,519	252	1.2	412	0.13
TOTALS AREA 3	66,838	1,161,829	1,618	2.4	3,091	0.27
Iowa	8,756	204,747	249	2.8	449	0.22
Minnesota	35,371	814,482	136	0.38	288	0.04
Nebraska	3,921	80,200	53	1.4	89	0.11
North Dakota	1,583	33,354	20	1.3	21	0.06
South Dakota	1,003	40,836	19	1.9	96	0.24
Wisconsin	23,906	612,903	211	0.88	675	0.11
TOTALS AREA 4	74,540	1,786,522	688	0.9	1,618	0.09
Idaho	421	9,165	1	0.24	1	0.01
Montana	657	16,661	3	0.46	4	0.02
Nevada	103	3,361	0	0.0	0	0.0
Oregon	20,511	202,559	31	0.15	56	0.03
Utah	3,495	31,518	99	2.8	162	0.51
Washington	1,295	24,346	16	1.2	76	0.31
Wyoming	754	10,350	5	0.7	5	0.05
TOTALS AREA 5	27,236	297,960	155	0.6	304	0.1
Arizona	1,427	24,493	22	1.5	29	0.12
California	17,290	630,584	277	1.6	1,427	0.23
Colorado	2,343	42,944	7	0.3	8	0.02
New Mexico	925	15,460	3	0.32	4	0.03
Texas	6,275	211,533	57	0.9	69	0.03
Hawaii	417	20,480	18	4.3	22	0.11
TOTALS AREA 6	28,677	945,494	384	1.3	1,559	0.16
Arkansas	2,207	35,433	9	0.4	102	0.29
Kansas	12,302	241,603	65	0.53	91	0.04
Louisiana	1,928	68,129	55	2.9	214	0.31
Mississippi	4,759	123,144	18	0.38	68	0.06
Missouri	12,624	241,763	38	0.3	105	0.04
Oklahoma	2,653	62,407	21	0.8	26	0.04
Tennessee	835	25,567	29	3.5	88	0.34
TOTALS AREA 7	37,308	798,046	235	0.6	694	0.09
Alabama	2,397	67,412	18	0.75	76	0.11
Florida	3,782	163,167	17	0.45	87	0.05
Georgia	2,804	102,598	45	1.6	126	0.12
North Carolina	10,140	143,150	9	0.09	31	0.02
South Carolina	3,674	69,528	4	0.1	5	0.007
Puerto Rico	5,682	79,406	52	0.9	310	0.39
Virgin Islands	77	7,465	0	0.0	0	0.0
TOTALS AREA 8	28,556	632,726	145	0.5	635	0.1
GRAND TOTALS	417,683	9,210,810	4,375	1.0	11,133	0.12

in dairy areas. The rapid identification of infected herds eliminates the need for the more expensive blood tests in a high percentage of the herds.

- b. A meeting of State and Federal personnel directly concerned with the development and use of the milk test was held during the past fiscal year. Arrangements were made to conduct experiments by heating milk with both hot air and hot water during the testing process, in an effort to increase the efficiency of the test. Such projects were undertaken in several different States and the results are being correlated at the national level.
- c. The incidence of brucellosis in cattle under supervision remained at 2.6%, the same as in fiscal year 1954. This percentage is based on blood tests conducted in 984,541 herds representing 14,186,241 cattle, and is a considerable increase over the previous year. These tests disclosed 365,247 reactors, of which 62,435 were held for gradual disposal without payment of indemnity. The fact that, in the face of a greatly increased testing program, the percentage of infection remained the same, is one of the most encouraging aspects in the fight against brucellosis. This clearly indicates that the previous educational program and the stimulus provided by the milk ring test have prompted many owners to rid their herds of brucellosis.
- d. As of June 30, 1955 there were 379 counties listed as modified certified brucellosis free areas, an increase of 45 over the previous year. Because of the expanded program, it is anticipated that there will be a considerable increase in the number of certified areas as of June 30, 1956. North Carolina, New Hampshire and Maine are the only States that are certified as completely brucellosis free at the present time.
- e. During the fiscal year 1955, there were 4,381,397 calves vaccinated with strain 19 vaccine, an increase of 10% over the previous fiscal year. The total of calves vaccinated since the inauguration of this practice in 1941 is 25,731,020.
- f. A recommendation was made at the November 1954 meeting of the United States Livestock Sanitary Association for a change in interpreting the blood agglutination test of animals officially vaccinated as calves, as compared to non-vaccinated animals. This recommendation was the outcome of evaluating the results of cooperative research between the Department and States. It permits greater titer tolerance with the properly vaccinated animal and through this recognition will encourage wider use of vaccine--one of the most important weapons against brucellosis in cattle.

g. Distribution of costs of the brucellosis eradication program and the sources of funds for the 1955 fiscal year are as follows:

	<u>Indemnity payments</u>	<u>Operating costs</u>	<u>Total</u>
Total program	\$ 4,614,606	\$10,718,791	\$15,333,397
Less, direct obligations under Salaries and Expenses, ARS	<u>- 331,945</u>	<u>-3,442,755</u>	<u>-3,774,700</u>
Cost of accelerated program a/	<u>4,282,661</u>	<u>7,276,036</u>	<u>11,558,697</u>

a/ Charged to funds transferred from Commodity Credit Corporation pursuant to Public Law 690, approved August 28, 1954.

A comparison of the funds provided for the fiscal year 1955 by the Federal Government and cooperating States and Counties follows:

	<u>Federal Government</u>	<u>Cooperators</u>
Indemnity	\$ 4,614,606	\$ 1,736,491
Operating funds	<u>10,718,791</u>	<u>9,497,240</u>
Total	<u>15,333,397</u>	<u>11,233,731</u>

The following tables and charts show by States the funds made available during the 1955 fiscal year.

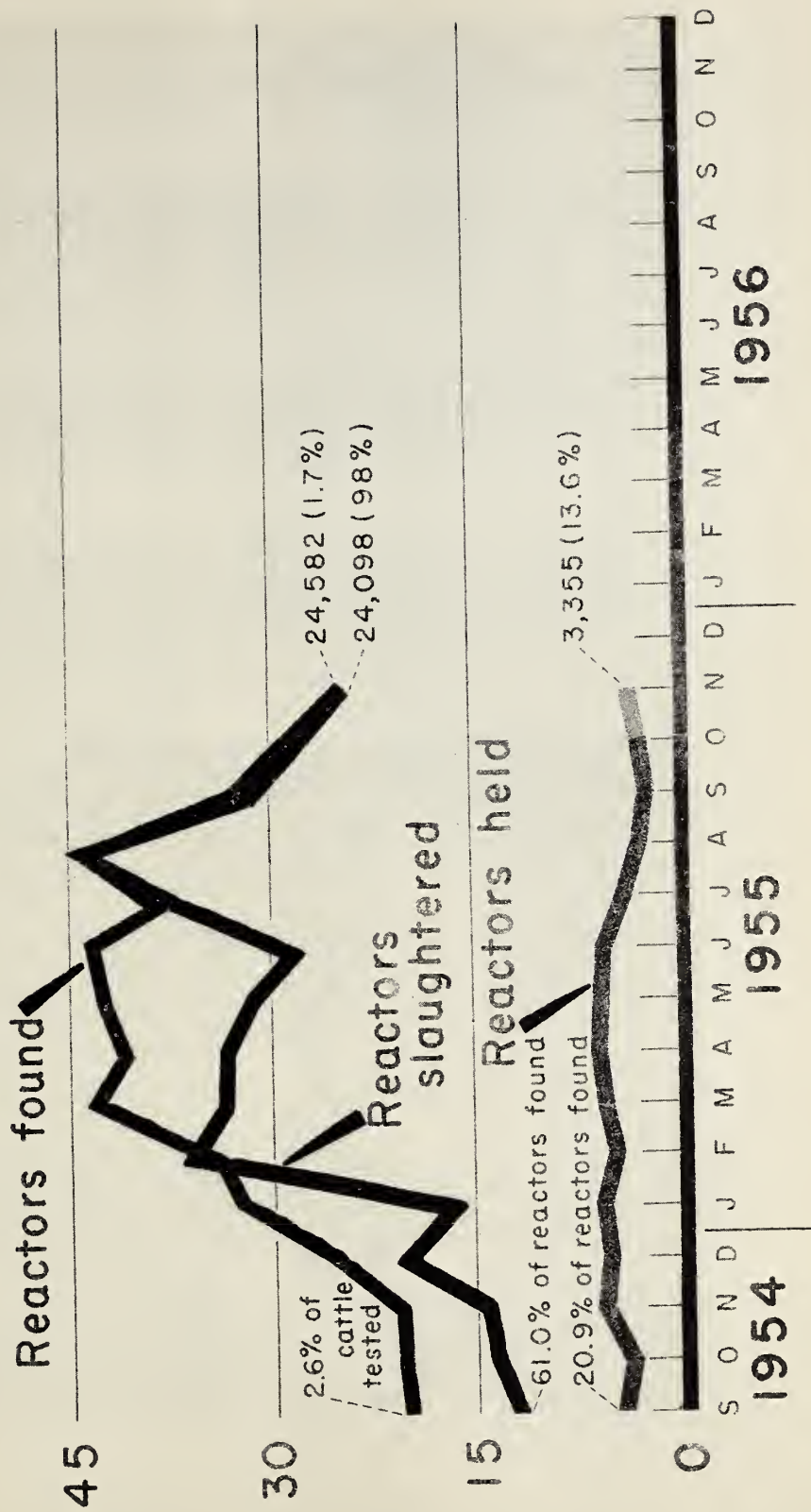
Brucellosis Eradication

Fiscal Year 1955

STATE	FEDERAL			STATE		
	Indemnity Payments	Operating Cost	Total	Indemnity	Operating Cost	Total
Alabama	151,200	254,700	405,900	-	90,000	90,000
Arizona	1,500	47,700	49,200	-	33,000	33,000
Arkansas	106,100	223,300	329,400	-	50,000	50,000
California	-	102,100	102,100	-	481,475	481,475
Colorado	8,500	116,400	124,900	-	21,200	21,200
Connecticut	200	13,000	13,200	3,000	105,000	108,000
Delaware	20,100	26,600	46,700	70,000	50,000	120,000
Dist. of Col.	-	837,100	837,100	-	-	-
Florida	21,800	179,200	201,000	3,000	114,880	117,880
Georgia	97,800	249,900	347,700	-	169,000	169,000
Idaho	25,700	165,100	190,800	1,500	65,000	66,500
Illinois	198,900	372,000	570,900	-	600,000	600,000
Indiana	115,600	206,500	322,100	-	571,948	571,948
Iowa	184,000	395,700	579,700	201,785	260,000	461,785
Kansas	-	80,800	80,800	-	44,029	44,029
Kentucky	80,600	132,600	213,200	-	80,000	80,000
Louisiana	325,800	245,300	571,100	-	258,355	258,355
Maine	18,700	99,300	118,000	37,000	72,627	109,627
Maryland	156,000	251,800	407,800	43,103	86,900	130,003
Massachusetts	3,800	35,700	39,500	-	32,000	32,000
Michigan	127,900	229,800	357,700	3,000	175,000	178,000
Minnesota	339,406	1,390,691	1,730,097	20,000	948,500	968,500
Mississippi	129,800	247,000	376,800	-	77,000	77,000
Missouri	282,100	546,400	828,500	-	113,768	113,768
Montana	-	378,100	378,100	-	250,000	250,000
Nebraska	84,200	222,100	306,300	5,000	170,000	175,000
Nevada	2,300	67,800	70,100	-	25,500	25,500
New Hampshire	3,900	29,100	33,000	18,000	74,500	92,500
New Jersey	48,900	62,000	110,900	40,000	138,765	178,765
New Mexico	11,000	89,100	100,100	3,800	14,000	17,800
New York	-	32,700	32,700	-	1,026,099	1,026,099
North Carolina	22,100	81,900	104,000	15,000	77,500	92,500
North Dakota	58,800	128,100	186,900	7,760	205,309	213,069
Ohio	-	153,600	153,600	-	230,604	230,604
Oklahoma	-	125,900	125,900	-	75,000	75,000
Oregon	37,500	158,000	195,500	80,000	112,880	192,880
Pennsylvania	293,200	232,900	526,100	500,000	765,000	1,265,000
Rhode Island	900	5,600	6,500	3,500	17,300	20,800
South Carolina	21,600	157,800	179,400	11,000	66,437	77,437
South Dakota	14,200	78,400	92,600	20,000	77,473	97,473
Tennessee	143,700	194,400	338,100	500	173,000	173,500
Texas	-	14,400	14,400	-	54,414	54,414
Utah	22,500	107,600	130,100	-	20,000	20,000
Vermont	50,800	97,200	148,000	25,000	70,000	95,000
Virginia	120,100	178,400	298,500	-	259,200	259,200
Washington	68,800	280,100	348,900	76,000	148,000	224,000
West Virginia	10,000	72,300	82,300	15,000	55,250	70,250
Wisconsin	1,151,300	1,088,700	2,240,000	484,543	782,227	1,266,770
Wyoming	10,000	111,900	121,900	-	10,000	10,000
Alaska	100	-	100	-	-	-
Puerto Rico	43,200	122,000	165,200	49,000	99,050	148,050
	4,614,606	10,718,791	15,333,397	1,736,491	9,497,190	11,233,681

BRUCELLOSIS ERADICATION PROGRAM

THOUSANDS





CATTLE TESTED FOR BRUCELLOSIS

MILLIONS

%

Total

Incidence of infection

2

4

2.4%

870,000

1,463,921

1.7%

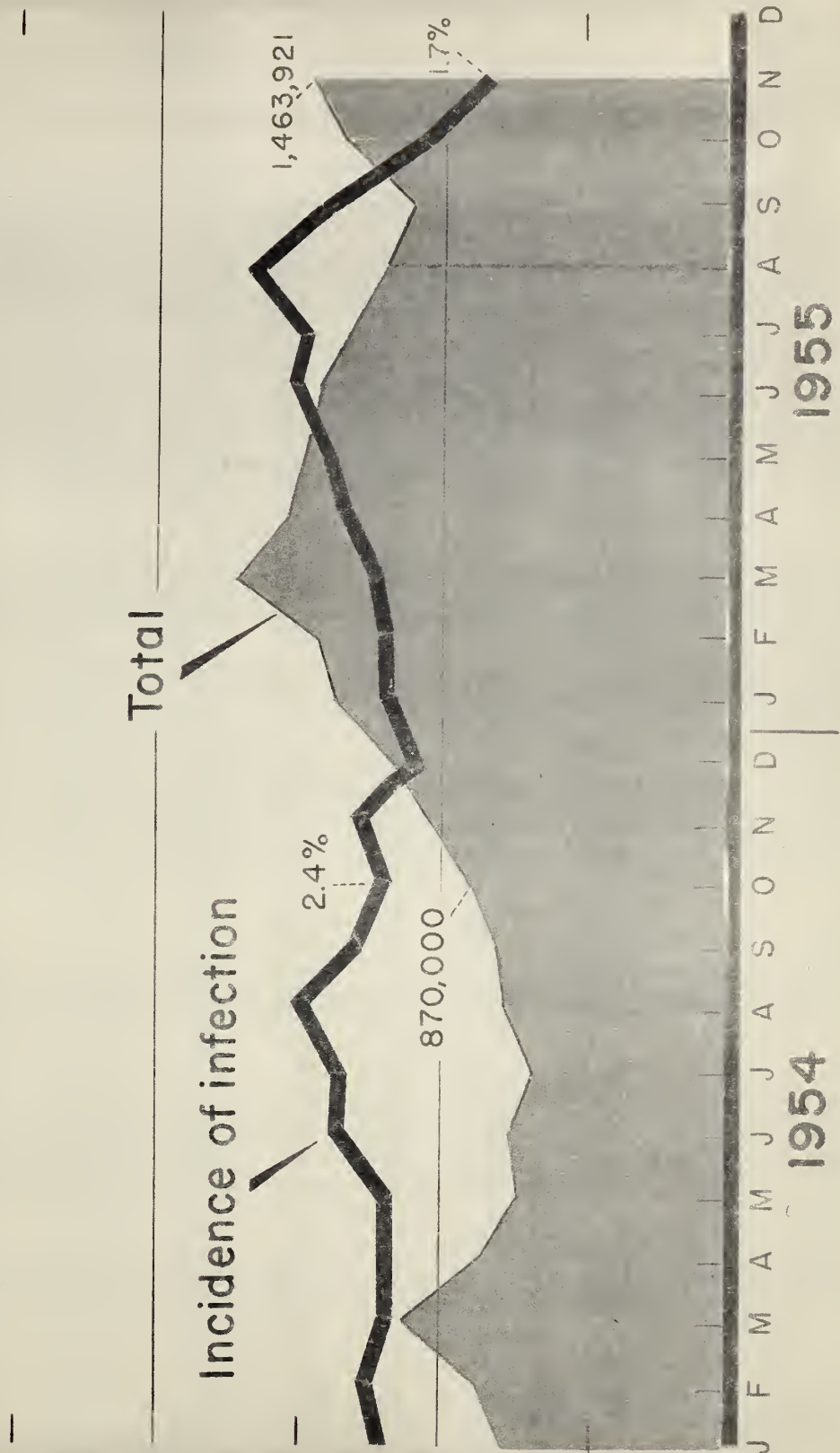
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1954

1955



UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
ANIMAL DISEASE ERADICATION BRANCH

SUMMARY OF BOVINE BRUCELLOSIS ERADICATION IN COOPERATION WITH THE VARIOUS STATES

FISCAL YEAR 1955

State or Territory	Brucellosis blood tests and Calfhood vaccinations								Brucellosis Ring tests		
	Herds tested	Cattle	Infected herds		Reactors		*Reactors Held	Calves vaccinated	Herds tested	Positive herds	Estimated Cattle represented
			Number	Per cent	Number found	Per cent					
Connecticut	5,195	106,067	468	9.0	846	0.8	837	19,668	0	0	0
Maine	13,954	156,033	430	3.1	697	0.4	34	8,291	8,808	199	177,465
Massachusetts	1,148	31,236	271	23.6	551	1.8	411	16,431	0	0	0
New Hampshire	7,273	97,958	72	1.0	140	0.1	0	10,468	0	0	0
New York	36,301	691,770	5,140	14.2	12,168	1.8	12,168	266,656	3,222	1,456	64,044
Rhode Island	343	8,514	47	13.7	86	1.0	40	2,441	0	0	0
Vermont	6,136	124,558	1,376	22.4	3,421	2.7	1,234	51,231	15,329	5,691	352,567
TOTALS AREA 1	70,350	1,216,136	7,804	11.1	17,909	1.5	14,724	375,186	27,359	7,346	594,076
Delaware	3,170	53,692	465	14.7	921	1.7	0	5,715	1,871	736	42,810
Kentucky	9,756	147,175	2,151	22.0	6,298	4.3	886	44,000	0	0	0
Maryland	11,909	321,658	2,722	22.9	7,698	2.4	303	45,874	0	0	0
New Jersey	8,353	183,241	999	12.0	2,314	1.3	368	17,191	977	201	31,808
Pennsylvania	57,575	855,006	6,078	10.6	12,459	1.5	444	127,871	50,809	1,462	583,101
Virginia	19,152	349,210	2,840	14.8	6,335	1.8	63	81,459	0	0	0
West Virginia	8,469	136,441	526	6.2	1,506	1.1	25	8,546	6,299	1,420	87,668
TOTALS AREA 2	118,384	2,046,423	15,781	13.3	37,531	1.8	2,089	330,656	59,956	3,819	745,387
Illinois	64,208	621,193	6,256	9.7	13,508	2.2	2,891	121,846	87,626	18,293	1,725,865
Indiana	45,547	437,863	6,096	13.4	12,034	2.7	2,605	57,566	93,075	25,462	1,340,574
Michigan	14,767	206,029	2,739	18.5	8,079	3.9	559	30,873	41,508	9,264	415,080
Ohio	35,511	298,508	4,867	13.7	10,892	3.6	3,443	64,767	73,237	14,400	937,440
TOTALS AREA 3	160,033	1,563,593	19,958	12.5	44,504	2.8	9,498	275,052	295,446	67,419	4,418,959
Iowa	42,279	420,396	8,519	20.1	22,821	5.4	0	226,759	109,413	27,151	1,804,678
Minnesota	124,854	2,580,281	21,861	17.5	48,951	1.9	6,793	139,111	126,119	19,741	2,168,802
Nebraska	22,363	272,720	2,706	12.1	6,644	2.4	93	118,937	41,072	6,096	483,778
North Dakota	21,339	438,846	2,878	13.5	8,970	2.0	1,129	60,026	13,147	315	130,302
South Dakota	4,268	42,381	785	18.4	2,787	6.6	1,642	18,573	51,652	11,419	774,780
Wisconsin	61,285	1,236,814	22,252	36.3	59,642	4.8	10,291	490,169	260,435	72,604	5,866,298
TOTALS AREA 4	276,388	4,991,438	59,001	21.3	149,815	3.0	19,948	1,222,575	601,838	137,326	11,228,638
Idaho	6,319	80,139	913	14.4	1,934	2.4	93	133,501	8,849	1,730	148,387
Montana	15,787	482,805	1,812	11.5	5,580	1.2	5,580	315,752	860	50	9,120
Nevada	718	11,512	72	10.0	209	1.8	144	52,705	0	0	0
Oregon	30,695	303,491	734	2.4	1,517	0.5	0	85,164	3,600	982	30,039
Utah	6,967	64,898	871	12.5	2,190	3.4	1,214	60,775	17,038	1,307	188,463
Washington	19,921	282,807	1,235	6.2	3,160	1.1	60	89,731	21,847	5,361	327,705
Wyoming	3,011	51,516	338	11.2	820	1.6	0	109,159	4,475	434	44,750
TOTALS AREA 5	83,418	1,277,168	5,975	7.2	15,410	1.2	7,091	846,787	56,669	9,864	748,464
Arizona	3,399	30,395	172	5.1	374	1.2	190	11,226	8	4	669
California	481	5,286	41	8.5	94	1.8	0	351,162	1,623	749	17,773
Colorado	14,192	122,801	1,363	9.6	2,244	1.8	1,027	80,791	7,416	1,004	143,335
New Mexico	4,645	58,038	164	3.5	598	3.4	16	26,451	0	0	0
Texas	15,067	78,599	1,496	9.5	2,994	3.8	0	67,590	0	0	0
TOTALS AREA 6	37,784	295,119	3,236	8.6	6,304	2.1	1,233	537,220	9,047	1,757	161,777
Arkansas	8,715	102,082	1,948	22.4	5,533	5.4	157	82,901	0	0	0
Kansas	17,340	134,976	2,173	12.5	4,969	3.7	117	72,198	11,242	2,420	122,170
Louisiana	14,749	210,712	4,758	32.3	18,261	8.7	2,402	86,754	6,438	4,511	187,770
Mississippi	13,158	203,543	2,626	20.0	9,112	4.5	434	101,403	9,999	3,461	221,988
Missouri	49,660	573,784	8,365	16.8	19,356	3.4	2,303	125,894	97,967	29,583	1,475,119
Oklahoma	8,402	111,576	1,737	20.7	4,511	4.0	450	71,774	14,388	1,907	60,857
Tennessee	8,760	168,221	2,763	31.5	8,342	5.0	43	104,804	13,255	7,772	254,879
TOTALS AREA 7	120,784	1,504,894	24,370	20.2	70,084	4.7	5,906	645,728	143,289	49,654	2,322,783
Alabama	24,341	233,231	2,282	9.4	7,715	3.3	361	48,388	0	0	0
Florida	10,005	122,739	753	7.5	2,503	2.0	35	40,220	2,437	486	125,357
Georgia	19,226	296,563	2,408	12.5	8,118	2.7	264	32,916	0	0	0
North Carolina	31,493	302,004	658	2.1	1,298	0.4	0	1,795	704	50	21,056
South Carolina	16,504	170,660	788	4.8	1,746	1.0	52	11,176	3,853	1,015	62,341
Puerto Rico	15,831	166,273	676	4.3	2,310	1.4	1,234	13,698	300	111	16,156
TOTALS AREA 8	117,400	1,291,470	7,565	6.4	23,690	1.8	1,946	148,193	7,294	1,662	224,910
GRAND TOTALS	984,541	14,186,241	143,690	14.6	365,247	2.6	62,435	4,381,397	1,200,898	278,847	20,444,994

* Included in non-vaccinated reactors found.

STATEMENT OF COMPARATIVE TESTING, HERDS AND CATTLE UNDER SUPERVISION, AVERAGE APPRAISAL, SALVAGE,
AND STATE AND FEDERAL INDEMNITY IN BRUCellosis ERADICATION WORK
FISCAL YEAR 1935 TO 1955 INCLUSIVE

Fiscal Year	Tests Conducted		Reactors found	Reactors held	Per- cent infec- tion	Under Supervision		Apprai- sal	Average during year		Federal	
	Herds	Cattle				Herds	Cattle		Sal- vage	States Paying Indemnity 1/Indemnity	State Indemnity	Indemnity
1935	212,482	3,317,760	381,010	-	11.5	187,109	2,936,347	\$56.86	\$19.87	1	\$27.99	\$24.29
1936	470,788	6,674,709	457,104	-	6.8	449,644	5,780,418	70.65	27.44	2	20.57	26.86
1937	630,917	8,021,167	397,864	-	5.0	719,452	7,877,612	70.67	27.94	5	19.25	26.45
1938	671,310	7,837,443	324,532	-	4.1	1,035,454	9,447,137	80.37	32.07	10	20.36	26.69
1939	724,613	7,521,398	219,165	-	2.9	1,372,410	11,111,643	97.17	33.97	28	26.09	20.00
1940	590,393	6,937,428	171,953	-	2.5	1,615,755	12,315,329	90.85	34.99	36	17.12	14.96
1941	677,544	7,465,254	182,075	-	2.4	1,883,914	13,932,693	93.28	37.68	40	17.19	15.19
1942	591,835	6,891,219	209,238	39,586	3.0	2,105,294	15,627,027	99.19	52.06	41	17.71	15.83
1943	392,636	5,185,228	197,329	53,558	3.8	2,199,535	16,616,522	128.03	64.87	40	18.63	16.77
1944	386,266	5,235,912	226,079	75,499	4.3	2,254,235	17,326,138	143.34	59.75	40	22.54	19.30
1945	395,236	5,213,458	243,050	86,738	4.7	2,307,585	17,545,638	139.35	56.63	40	22.14	19.25
1946	389,814	4,876,866	245,786	74,922	5.0	2,360,699	17,870,154	149.65	68.64	40	22.07	19.34
1947	454,789	5,133,814	232,293	68,977	4.5	2,249,118	17,589,018	178.25	82.93	40	23.44	20.64
1948	533,936	5,434,792	232,199	68,653	4.3	2,291,760	18,128,318	203.98	107.38	39	24.44	21.17
1949	563,501	5,671,347	226,691	66,351	4.0	2,165,364	17,126,480	256.46	132.11	37	25.67	23.41
1950	618,801	5,974,721	208,298	60,686	3.5	2,299,556	18,527,624	237.68	114.21	31	25.16	22.75
1951	565,155	5,640,836	172,322	60,418	3.1	2,324,621	19,197,790	326.85	189.45	22	23.47	21.41
1952	670,738	7,421,327	314,260	179,101	4.2	2,149,078	21,496,113	334.68	189.39	25	26.03	24.05
1953	660,344	7,860,870	268,348	149,628	3.4	2,102,545	21,607,676	276.52	122.52	25	25.59	22.32
1954	696,207	9,002,109	235,666	80,672	2.6	2,298,284	24,572,013	190.90	89.18	26	20.64	2/ 11.71
1955	984,541	14,186,241	365,247	62,435	2.6	2,585,277	31,948,708	189.36	87.38	42	20.85	3/ 20.65

- 1/ During period May 1, 1929 to Oct. 8, 1954, Federal indemnity payment limited to not exceed total amount paid by cooperating State agencies. Includes Puerto Rico
- 2/ Federal indemnity for the period September 23, 1953 to October 8, 1954 was limited to \$9.00 for grade and \$18.00 for purebred animals.
- 3/ Effective October 8, 1954 the requirement that states match Federal indemnity payments was rescinded, and maximum payments were again raised to \$25.00 and \$50.00.

3. Scabies Eradication Produces Good Results.

- a. Sheep scabies. At the request of major sheep raisers associations, as well as many individuals, the Department is giving attention to a total eradication program. An intensive scabies eradication campaign has been carried on in Louisiana and Mississippi for several years. This all-out drive has brought increasingly good results, but occasional scabby sheep are still being found. This existing infection continues to be a serious threat. Eradication measures were also carried out in other States.

A comparison of operations in fiscal year 1955 with fiscal year 1954 follows:

	<u>F. Y. 1954</u>	<u>F. Y. 1955</u>
Sheep inspected	5,477,334	5,587,267
Sheep dipped	390,530	391,952
Infected sheep located	40,894	34,460
Infected flocks	391	442
States reporting sheep scabies	21	24
Counties reporting sheep scabies .	183	219

- b. Cattle scabies. A comparison of operations during the past two fiscal years follows:

	<u>F. Y. 1954</u>	<u>F. Y. 1955</u>
Cattle inspected	1,090,260	1,146,174
Cattle sprayed or dipped	32,844	396,268
Infected cattle located	10,749	9,523
Infected herds	64	60
States reporting cattle scabies ...	14	15
Counties reporting cattle scabies .	38	41

- c. The accompanying tables and charts show the geographical distribution of sheep and cattle scabies.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE

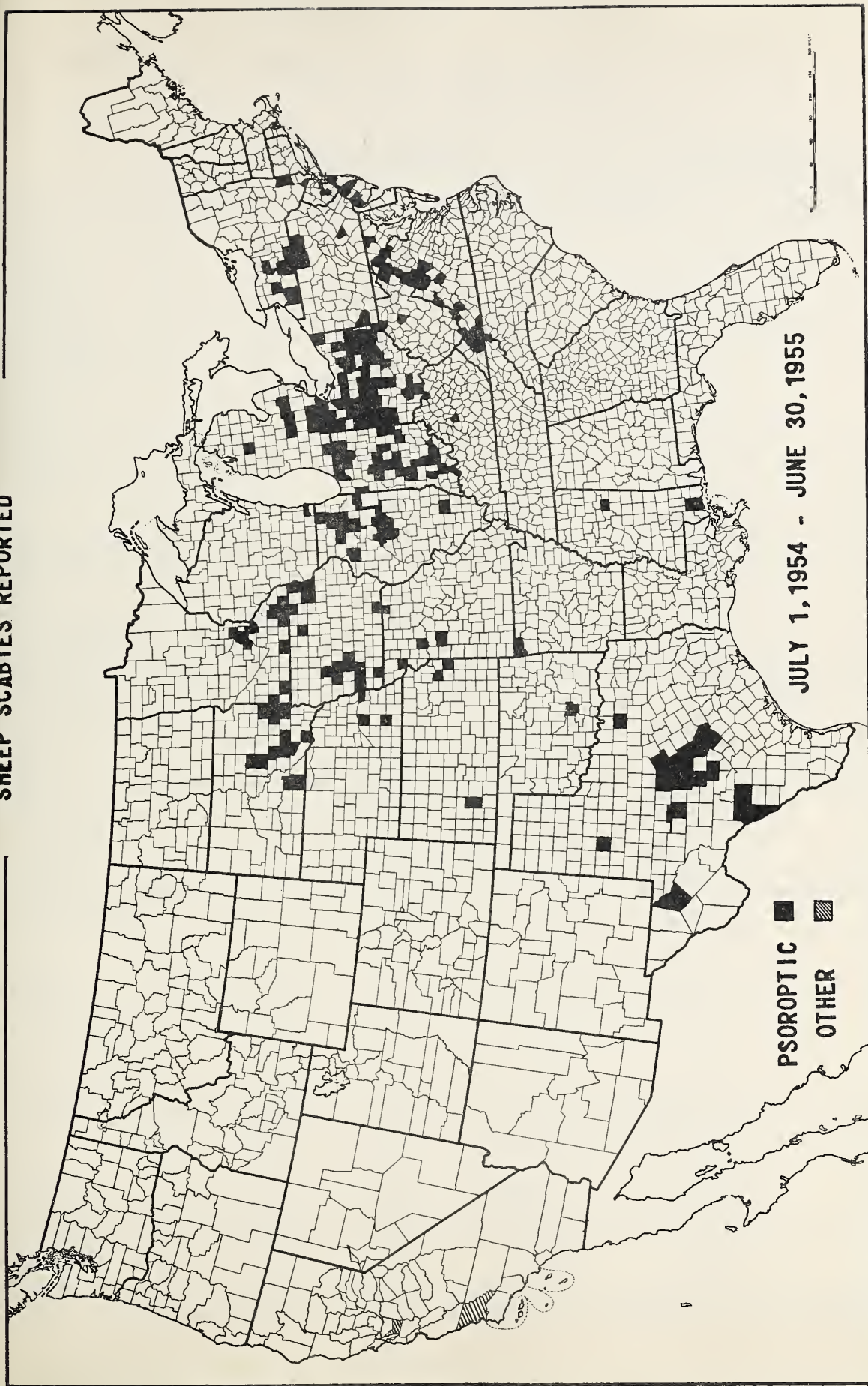
ANNUAL REPORT OF COOPERATIVE FEDERAL-STATE SHEEP SCABIES ERADICATION
July 1, 1954 - June 30, 1955

State	Number of Infected			Total Sheep	
	Counties	Flocks	Sheep	Inspected	Dippings
Alabama	0	0	0	0	0
Arizona	0	0	0	569,133	58
Arkansas	1	3	518	25,504	968
California	2	a/	a/	689,133	292
Colorado	0	0	0	27,406	0
Connecticut	0	0	0	0	0
Delaware	0	0	0	803	0
Florida	0	0	0	0	0
Georgia	0	0	0	0	0
Idaho	0	0	0	14,302	1
Illinois	14	25	2,523	89,012	2,711
Indiana	31	71	2,830	11,882	5,757
Iowa	14	20	2,521	71,901	3,186
Kansas	3	7	868	128,527	2,364
Kentucky	3	3	290	172,238	290
Louisiana	0	0	0	307,557	171,218
Maine	0	0	0	0	0
Maryland	1	1	300	300	300
Massachusetts	0	0	0	0	0
Michigan	12	25	1,819	a/	a/
Minnesota	10	16	2,923b/	a/	0
Mississippi	3	3	2,961	289,170	48,793
Missouri	4	7	582	2,933	735
Montana	0	0	0	0	0
Nebraska	3	3	328	17,191	412
Nevada	0	0	0	86,769	0
New Hampshire	0	0	0	0	0
New Jersey	6	17	322	a/	a/
New Mexico	0	0	0	1,285,706	0
New York	7	10	539	647	75
North Carolina	0	0	0	0	0
North Dakota	0	0	0	0	0
Ohio	46	111	5,651	11,185	8,487
Oklahoma	1	1	96	1,113	498
Oregon	0	0	0	0	0
Pennsylvania	4	6	862	a/	75
Rhode Island	0	0	0	0	0
South Carolina	0	0	0	0	0
South Dakota	12	21	2,421	220,736	11,566
Tennessee	1	2	79	a/	a/
Texas	19	33	2,359	1,322,295	127,940
Utah	0	0	0	0	0
Vermont	0	0	0	0	0
Virginia	15	33	1,973	49,911	1,754
Washington	0	0	0	80,847	0
West Virginia	6	23	1,669	14,090	2,402
Wisconsin	1	1	26	a/	a/
Wyoming	0	0	0	96,976	2,070
TOTAL	219	442	34,460	5,587,267	391,952

a/ Not reported

b/ Slaughtered

SHEEP SCABIES REPORTED



JULY 1, 1954 - JUNE 30, 1955

PSOROPTIC
OTHER

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE

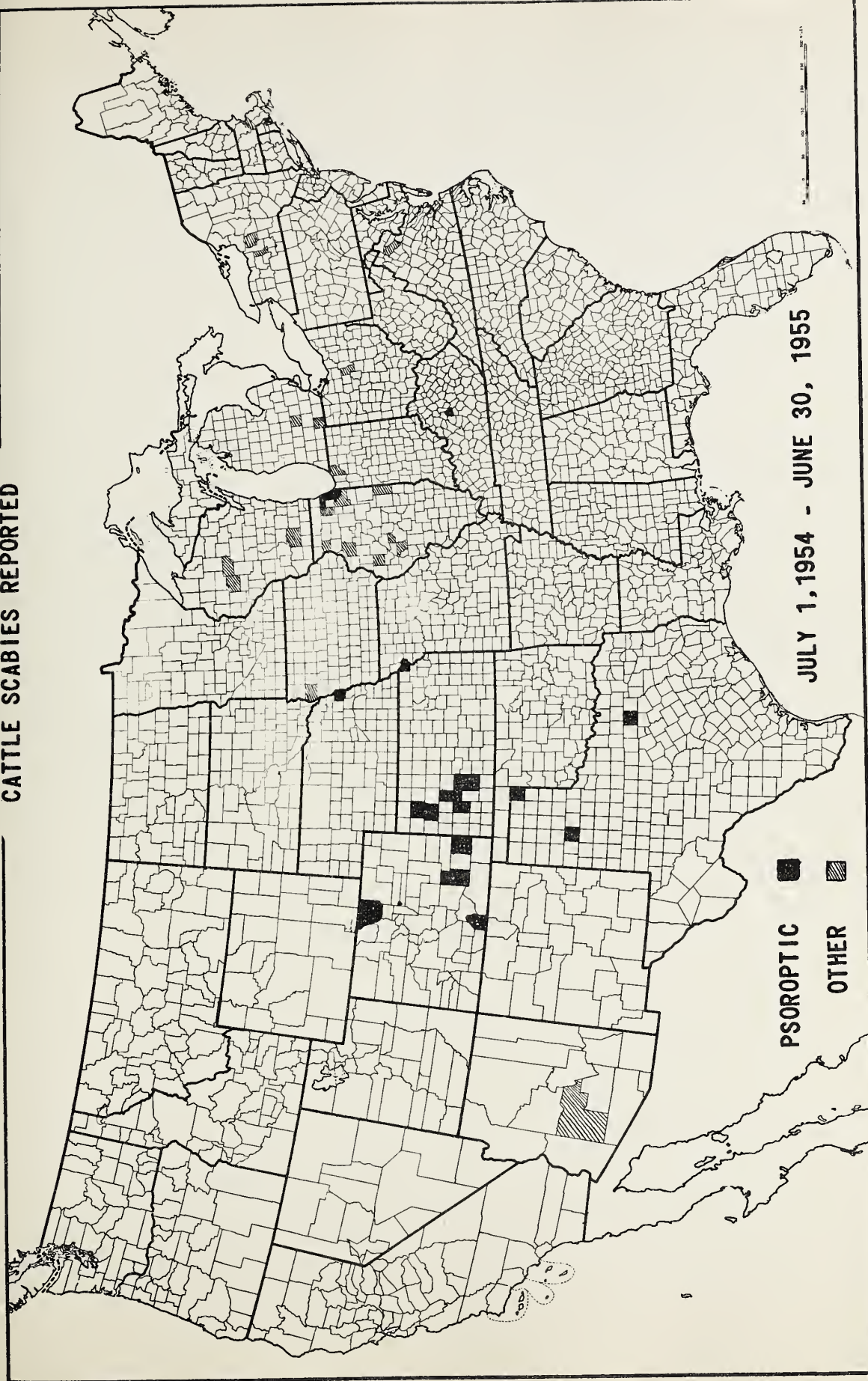
ANNUAL REPORT OF COOPERATIVE FEDERAL-STATE CATTLE SCABIES ERADICATION
July 1, 1954 - June 30, 1955

State	Number of Infected			Total Cattle	
	Counties	Herds	Cattle	Inspected	Dippings or Sprayings
Alabama	0	0	0	0	0
Arizona	1	1	100	181,100	0
Arkansas	0	0	0	0	0
California	0	0	0	330,276	0
Colorado	6	16	2,361	51,812	356,186
Connecticut	0	0	0	0	0
Delaware	0	0	0	0	0
Florida	0	0	0	0	0
Georgia	0	0	0	0	0
Idaho	0	0	0	0	0
Illinois	9	15	348	4,438	795
Indiana	1	1	34	a/	a/
Iowa	2	3	123	5,324	160
Kansas	7	8	1,722	62,968	3,862
Kentucky	1	1	100	a/	a/
Louisiana	0	0	0	0	0
Maine	0	0	0	0	0
Maryland	0	0	0	0	0
Massachusetts	1	1	27	a/	a/
Michigan	2	2	57	a/	a/
Minnesota	0	0	0	0	0
Mississippi	0	0	0	0	0
Missouri	0	0	0	1,301	0
Montana	0	0	0	32	0
Nebraska	1	1	37	13,403	3,367
Nevada	0	0	0	3,879	0
New Hampshire	0	0	0	0	0
New Jersey	0	0	0	0	0
New Mexico	0	0	0	20,349	0
New York	2	2	8	100	20,907
North Carolina	0	0	0	0	0
North Dakota	0	0	0	0	0
Ohio	1	1	4	4	8
Oklahoma	0	0	0	342	0
Oregon	0	0	0	0	0
Pennsylvania	0	0	0	0	0
Rhode Island	0	0	0	0	0
South Carolina	0	0	0	0	0
South Dakota	0	0	0	0	0
Tennessee	0	0	0	0	0
Texas	3	3	4,273	470,200	10,449
Utah	0	0	0	0	0
Vermont	0	0	0	0	0
Virginia	1	1	267	267	534
Washington	0	0	0	0	0
West Virginia	0	0	0	0	0
Wisconsin	3	4	62b/	a/	0
Wyoming	0	0	0	373	0
TOTAL	41	60	9,523	1,146,174	396,268

a/ Not reported

b/ Only Chorioptic reported.

CATTLE SCABIES REPORTED



4. Cattle Fever Tick Eradication Strengthened.

- a. Department and cooperative employees continued to supervise inspections or dippings as follows:

	<u>F. Y. 1954</u>	<u>F. Y. 1955</u>
United States	1,344,330	1,483,312
Puerto Rico (including sheep and goats)	516,387	141,216
Total	1,860,717	1,624,528

- b. Dippings and inspections were continued in Florida at auction markets and in areas where recent reinfestations were previously found, with negative results.
- c. Because of the tick infested territory in Mexico adjacent to the border, a narrow buffer area in Texas was constantly inspected to prevent the introduction and dissemination of tick fever. Drought again caused a critical situation along the border as many sources of water dried up in Mexico, as well as in extended sections of the Rio Grande, from Laredo to the Gulf. Without a good river barrier Mexican livestock continued to drift into Texas in increasing numbers seeking water. With the opening of the border on December 31, 1954, it was necessary to increase the force of regular tick inspectors in this area.

5. Diagnosis, Control and Eradication of Miscellaneous Diseases Continues.

- a. Hog cholera. The incidence of hog cholera has been comparatively low. There has been a gradual change in the immunizing agents used as a preventive measure. The use of immunizing agents employing a modified-live virus in place of virulent virus and serum has increased to about two-thirds of the total used. Moreover, there are now four States in which the sale or use of fully virulent hog cholera virus is prohibited.
- b. Swine erysipelas vaccinations. Federal employees cooperated with State officials, swine growers, and others in the vaccination of swine against this disease. Injections of the serum-culture immunization in fiscal year 1955 compared with those in fiscal year 1954 are as follows:

	<u>F. Y. 1954</u>	<u>F. Y. 1955</u>
<u>Receiving first injections</u>		
Swine	4,545,462	5,329,099
Herds	63,917	75,275
<u>Receiving second injection</u>		
Swine	21,541	32,806
Herds	384	810

- c. Bluetongue of sheep. This disease was reported in Arizona, California, Colorado, Kansas, Missouri, Nebraska, New Mexico, Oklahoma, Texas, and Utah. The Department is continuing to cooperate with State officials, sheep owners, and others in the diagnosis of the disease and with biological houses in the production, testing, and field use of a vaccine for the prevention of bluetongue.
- d. Scrapie of sheep. Scrapie, a chronic neurosis of sheep, has been diagnosed in the States of California, Connecticut, Illinois, Indiana, Michigan, New York, Ohio, and Oregon, as previously reported, and in the following additional States in the fiscal year 1955: Georgia, Tennessee, and Texas. Eradication of this disease by destruction of infected and exposed animals and by inspecting flocks which have been associated with these animals is being carried out. Approximately 1,500 flocks in 46 States are under surveillance due to their association with scrapie-infected or exposed sheep. This involves semi-annual inspections for three years following exposure. While movement of animals is not restricted, records of the movements are maintained and inspections are continued in the new locations.

In fiscal year 1955, scrapie was diagnosed on two premises each in Ohio, Indiana, and Oregon, and on one premise each in Illinois, Texas, Tennessee, and Georgia. All flocks known to have been infected with scrapie were eradicated. Indemnities for the 1955 fiscal year amounted to \$52,481 representing 3,577 sheep from 51 flocks.

- e. Dourine and glanders of horses. Some 4,102 samples of equine serum were submitted for laboratory examination in Washington, D. C. They were largely from the Papago Indian Reservation in Arizona. The work on the Indian reservation was carried out under specific agreement with the Bureau of Indian Affairs, Department of the Interior, each agency sharing in the cost. Samples submitted from other States were negative to the complement-fixation test for dourine. Six cases of glanders were found on the Papago Reservation in Arizona during 1955. This disease is prevalent in adjacent Mexico and will be a constant threat to the United States as long as it exists there. The United States had been free of this disease for a number of years.
- f. Anthrax. During the year 390 outbreaks of anthrax were reported in 91 counties in 22 States where 1,684 cattle, 120 swine, 103 sheep, 330 equines, and 1 deer died of this disease. A severe outbreak of anthrax during the late summer months of 1954 in Louisiana and Mississippi was brought under control by State and Federal authorities.

- g. Leptospirosis. From field reports emanating from various sections of the country, it would appear that *Leptospira* infection in cattle constitutes a serious threat to the livestock industry. In addition to cattle, leptospirosis may affect various other species of animals, including swine, dogs, horses, and rodents. Consequently, the problem of control and eradication is complicated by the numerous potential hosts involved. The Department is arranging for cooperative survey projects in selected States, designed to survey the incidence of this disease, in conjunction with bovine brucellosis eradication activities. A plate agglutination test will be employed for identification of the disease. A representative of the Department was assigned to study this test at the U. S. Public Health Service Laboratory in Hamilton, Montana, where it was developed. The fact that leptospirosis is infectious to man as well as animals, emphasizes the need for developing effective measures to combat the disease.
- h. Anaplasmosis. Although the true incidence of anaplasmosis is unknown, this disease is recognized as an increasingly serious problem in many sections of the country. In view of this growing concern, the Department arranged for a joint meeting of Federal and State livestock sanitary officials in Chicago, Illinois, February 28, 1955, for the purpose of reviewing the anaplasmosis situation. At this meeting, Department representatives encouraged extensive survey testing as a means of determining the extent of the disease throughout the country, and developing additional information on the nature and characteristics of the infection as observed in the field. Since that time, a number of States have undertaken cooperative studies of this nature in which Department-trained serologists using Department-produced antigen, have been conducting tests for anaplasmosis. As this work progresses, it should be possible to identify the important centers of anaplasmosis throughout the nation and to assemble data of value in developing sound control and eradication practices. With an efficient diagnostic test now available for the first time, prospects of finding a solution to the anaplasmosis problem are more encouraging.
- i. Psittacosis (ornithosis). Following the widespread outbreaks reported in 1954, the Department has taken an active interest in the turkeypsittacosis problem. Close contacts with officials in the various turkey-raising States have been maintained as a means of assessing the incidence of reported cases. Even though limited serological surveys indicate the existence of this disease in many States, it was rarely observed during the past year in the virulent form associated with the 1954 outbreaks. The Department has reaffirmed its desire to cooperate with the States in efforts to develop the information necessary to control the spread of this disease and maintain disease-free flocks. Because of the public health aspects associated with psittacosis, a close relationship with public health agencies in the areas involved has been established.

- j. Poultry diagnostic facilities. A survey designed to determine the availability of laboratory facilities for diagnosis of poultry diseases has been completed. The object of the survey was to assess the national resources for quickly diagnosing foreign poultry diseases that might be introduced into this country by accident or intent. The group making the survey recommended that the Department develop a plan to provide for (1) diagnosis on a regional basis of any foreign diseases that might be introduced into this country and (2) control and eradication on a regional basis of such diseases after diagnosis.
- k. Field investigations. Many reports of conditions simulating foot-and-mouth disease were investigated but proved not to be that disease. All cases of animal and poultry diseases suspected as being of foreign origin were promptly investigated to insure prompt detection and appropriate protective measures.
- l. Unidentified infectious diseases of cattle. More than 20 States have reported that they have a condition in their cattle that appears to be an unidentified infectious disease, or diseases. In order to discuss these conditions fully and coordinate the research work being done on the problem, the Department called a meeting at Purdue University, Lafayette, Indiana, on February 7 and 8, 1955. The meeting was attended by research workers from various universities, who have been working with these diseases, as well as the State and Federal regulatory officials in that immediate vicinity. A committee was selected to canvass all the States in an endeavor to find out how many were doing research on these conditions, and what type research was being done. Research would continue on these conditions and a similar meeting will be held later to determine what progress has been made.

6. Supervision Maintained over Interstate Movement of Livestock.

- a. Workload increased. The purpose of inspection at public stockyards is to prevent the interstate movement of diseased livestock and to facilitate the interstate movement of healthy livestock. The increased channeling through the stockyards of brucellosis reactors, the need for assistance in preventing the spread of vesicular exanthema of swine, the changes in methods of transporting livestock involving the increasing use of trucks and the decreasing use of rail shipments, and the opening of additional stockyards have all operated to increase the work.

The increased volume of work at public stockyards during the fiscal years 1954 and 1955 is reflected in the following table:

	<u>F. Y. 1954</u>	<u>F. Y. 1955</u>
Number of stockyards operating	46	48
Number of cities in which located .	44	46

	<u>F. Y. 1954</u>	<u>F. Y. 1955</u>
Animals inspected:		
Cattle	25,810,912	25,846,685
Sheep	13,179,281	13,441,471
Swine	23,182,295	26,989,458
Total animals inspected	<u>62,172,488</u>	<u>66,277,614</u>
Animals dipped and immunized:		
Cattle dipped	13,019	11,846
Sheep dipped	241,689	242,627
Swine immunized	131,108	162,254
Total animals dipped and immunized.	<u>385,816</u>	<u>416,727</u>
Health certificates issued for		
shipments	221,006	232,464
Infectious cars received	1,295	1,813
Cars cleaned and disinfected	28,122	12,050
Diseased animals received (1955		
total includes Tuberculosis 5,307;		
Brucellosis 175,452; paratuber-		
culosis 145)	106,918	180,904

The continued expansion of the brucellosis eradication program will increase considerably the number of diseased animals handled through the yards during the fiscal year 1956.

- b. Enforcement of the Animal Quarantine Acts. The purpose of the Animal Quarantine Acts and the regulations implementing these statutes is to prevent the interstate movement of diseased animals. The enforcement of these regulations has an important bearing on the welfare of the livestock industry throughout the country for its interests would be seriously impaired if the work was not energetically prosecuted.

The Department received reports of 260 violations of the Animal Quarantine Acts. An additional 56 reported violations under investigation at the beginning of the year made a total of 316 reports to be handled. Prosecution was recommended in 62 cases. There was insufficient evidence in 152 cases to warrant prosecution and they were filed without action. One hundred and two cases were being investigated at the close of the year. Disposition was made by the courts during this period of 40 cases and fines totaling \$3,550 were imposed.

- c. Enforcement of the 28-Hour Law. The purpose of the 28-Hour Law is to prevent the over-confinement of animals shipped in interstate commerce by common carrier. Waybills and records maintained by carriers and others are examined daily and apparent violations reported by Federal livestock inspectors. Inspections are also made from time to time at approximately 900 feed, water, and rest stations in 48 States to ascertain if the facilities and equipment are maintained for the safe and humane handling of the species of animals which they were designed to accommodate.

During the year 224 reports of alleged violations of the 28-Hour Law were received. An additional 28 reported violations under investigation at the beginning of the year made a total of 252 reports to be handled. 102 cases were recommended to the Office of the General Counsel of the Department for prosecution. Of the remaining 150 cases, 121 were filed without action because of circumstances or conditions that were considered as excusing the carrier for its failure to comply with the requirements. At the end of the year 29 cases were under investigation. Reports showed penalties of \$13,100 and costs were imposed by the courts on 121 violations.

Animal Inspection and Quarantine:

1. Inspection and quarantine of import animals and poultry. In accordance with the regulations of the Department, all horses, ruminants, swine, and poultry offered for importation into the United States were carefully inspected at coastal, air, and border ports of entry. Certain animals and poultry are quarantined upon arrival at designated quarantine stations in order to prevent the introduction and dissemination of diseases of foreign origin into the United States. Eight times during the year (five times at the port of New York and three times at the port of Los Angeles) Newcastle disease was detected in quarantined poultry. Strains isolated proved to be highly lethal. The disease occurred only once in imported chickens, the remaining cases occurring in quail, partridges, and pheasants imported for restocking purposes.

Mexico was declared free of foot-and-mouth disease on December 31, 1954 and the border was reopened on January 1, 1955, to importations of ruminants and swine, their products and certain other products which might be a means of introducing the virus of foot-and-mouth. This caused a large influx in the importation of cattle from Mexico during the last half of the fiscal year.

The Bureau of Customs of the Department of the Treasury and the Public Health Service of the Department of Health, Education, and Welfare continued their valuable assistance in the administration of these import regulations. Public Health Service officials at ocean ports obtained for the Department 24,962 declarations from masters of ships certifying to the absence or presence of prohibited animals, or meats therefrom, aboard their vessels.

Animals, Including Poultry, Inspected and Passed for Entry, Fiscal Year 1955:

	: Canadian :border ports:	: Mexican :border ports:	: Ocean : ports :	: Total	:Refused : entry
Cattle	73,089	218,467 a/	41	291,597	229
Swine	25,885	---	554	26,439	--
Sheep	8,598	---	622	9,220	--
Goats	8	---	1,526	1,534	--
Equines	26,647	18,587	880	46,114	68
Poultry	3,711	---	4,758	8,469	--
Other animals .	21	---	107	128	--
Eggs	25	---	2,292	2,317	--
Total	137,984	237,054	10,780	385,818	297

a/ Border opened for importation of cattle on January 1, 1955.

2. Certification of purity of breeding and identity of animals offered for free entry. Under the provisions of Paragraph 1606 of the Tariff Act of 1930, certificates as to purity of breeding were issued for 19,732 animals imported during fiscal year 1955. The purebred animals certified for entry free of duty were, by species, as follows:

Horses	419
Cattle	16,832
Sheep	1,067
Swine	798
Goats	2
Dogs	610
Cats	4

Total 19,732

3. Sanitary control of imported animal products and forage. Sanitary control was maintained over the entry of various animal products, and hay and straw. Products permitted entry under restrictions designed to prevent the introduction into the United States of foot-and-mouth disease, rinderpest, anthrax, or other infectious diseases of animals and poultry were transported from the port of entry under seal to approved destination establishments and there handled under supervision.

The large volume of animal products imported during fiscal year 1955 included 56,941,568 hides and skins and over 383 million pounds of wool. In addition to the foregoing, approximately 160,000 tons of miscellaneous animal byproducts were given inspection during the fiscal year. Railroad cars, trucks, and premises involved in the transportation and handling of restricted products were disinfected.

Particular attention was given to preventing the landing of fresh, chilled, or frozen meats, or garbage derived therefrom, from air and ocean transports provisioned in countries where foot-and-mouth disease or rinderpest exists. During the year, 28,542 first-port-of-call ocean vessels and 52,386 airplanes arrived in foreign commerce.

Unsterilized hay and straw used as packing material from countries where foot-and-mouth disease or rinderpest exists were destroyed.

4. Inspection of export animals and transporting vessels. The law requires that domestic ruminants and swine intended for export be free from disease, and that vessels on which they are to be transported be equipped to insure their safe transport and humane handling. Animals are inspected and tested in various districts of origin throughout the United States and supervision is given to livestock facilities and other accommodations on ocean vessels and aircraft. During the last fiscal year there has been a definite trend towards the export shipment of livestock to foreign countries by air rather than by ocean vessel. This has presented an acute inspection problem at some ports of export, inasmuch as individual air shipments are much smaller than shipments by ocean vessel but require, in many instances, nearly the same inspection time. Since air ports are usually located many miles from ocean ports where Department activities are normally conducted, it has become necessary to assign additional inspectors to provide proper inspection service. In fiscal year 1955, a total of 40,751 animals were inspected and tested for export as follows:

Kind of Animal	Destination			
	Canada	Mexico	Other Countries	Total
Cattle	2,127	7,516	19,440	29,083
Swine	---	377	1,544	1,921
Sheep	3,174	1,836	456	5,466
Goats	40	173	388	601
Equines	94	1,425	1,229	2,748
Other animals	848	84	---	932
Total	6,283	11,411	23,057	40,751

5. Control of manufacture, importation, shipment, and marketing of viruses, serums, toxins, etc.
 - a. Inspection of animal biologics. Outstanding licenses under the Virus-Serum-Toxin Act permitted the production of 122 different biological products as of June 30, 1955. Several products are manufactured in more than one form so that the total number of different biological products was 188. The number of filed production outlines from licensees representing these products totaled 977. Labels and circulars for licensed biological products reviewed during this fiscal year totaled 2,656 sets.

Preliminary steps were taken during the year to effect the transfer of personnel preparatory to redirecting the inspection of more biological products on an intensified basis, insofar as funds would permit, in order to carry out the directive of Congress in House Report No. 303 on the 1956 appropriation bill.

In order to acquaint inspection personnel with the latest techniques which could be employed in the inspection of newer types of veterinary biological products, a limited number of employees received two weeks of special training in this field at Michigan State University, East Lansing, Michigan.

The progress and anticipated extent of the work is reflected in the following table:

	: Actual	: Estimated	: Estimated
	: F.Y. 1955	: F.Y. 1956	: F.Y. 1957
Establishments producing anti-hog-cholera serum and hog-cholera virus ..	: 29	: 28	: 28
Production (cc):			
Serum (completed product)	: 897,266,491	: 852,500,000	: 826,000,000
Virus:			
Simultaneous ..	: 34,204,255	: 32,500,000	: 31,700,000
Hyperimmunizing	: 172,524,817	: 164,000,000	: 160,000,000
Inoculating ...	: 646,121	: 616,000	: 604,000
Animal inspections.	: 2,382,925	: 2,260,000	: 2,217,000
Tests supervised ..	: 8,136	: 7,700	: 7,500
Establishments producing hog-cholera vaccine	: 17	: 18	: 19
Production (doses)	: 30,315,423	: 32,750,000	: 35,360,000
Establishments producing other biologics	: 48	: 50	: 52
Production:			
CC	: 698,125,113	: 754,000,000	: 784,000,000
Milligrams	: 426,623,090	: 460,000,000	: 480,000,000
Units	: 453,512,039	: 462,000,000	: 481,000,000
Products destroyed (all kinds):			
CC	: 35,027,336	: 38,000,000	: 39,000,000
Milligrams	: 68,114,299	: 73,000,000	: 76,000,000
Units	: 25,264,190	: 25,000,000	: 25,000,000
Export certificates issued	: 1,041	: 1,100	: 1,200

2,853 samples of biological products and sub-cultures of organisms were collected and forwarded to Washington laboratories for testing. Included in these were 1,927 samples of Brucella abortus vaccine, 6.3 percent of which were found unsatisfactory on laboratory examination. These unsatisfactory batches of Brucella abortus vaccine were destroyed under Federal supervision and represented 1,940,985 cc or enough vaccine to treat 368,197 calves. In the course of 1,011 purity and safety tests on hog-cholera virus, approximately 7.8 percent of the batches tested were suspected of containing the swine-erysipelas organism. When subjected to laboratory examination, approximately 2.5 percent were found to contain the erysipelas organism and the virus was destroyed under the supervision of a Federal inspector.

The following table shows the volume of biological products certified for export:

Products <u>1/</u>	Estimated			
	F.Y. 1954	F.Y. 1955	F.Y. 1956	F.Y. 1957
Anti-hog cholera:				
serum (cc)	26,779,000	32,794,000	34,433,700	35,121,660
Other serums	232,000	318,000	333,900	343,700
Hog cholera				
virus (cc)	1,005,000	1,006,000	1,056,300	1,125,000
Aggressins	2,000	5,000	5,000	5,000
Antitoxins				
(units)	6,737,000	2,956,000	3,500,000	4,175,000
Bacterins	4,976,000	4,440,000	4,217,800	4,005,000
Diagnostics	236,000	1,187,000	1,250,000	1,375,000
Vaccines	6,939,000	7,558,000	8,935,900	9,845,000

1/ Doses unless otherwise indicated

6. Anti-hog-cholera serum and hog cholera virus Marketing Agreement and Order. The following table shows by fiscal years comparable figures of the number of handlers operating under the Marketing Agreement and Order:

	Actual		Estimated	
	1954	1955	1956	1957
Producer-handlers	28	30	30	29
Distributor-handlers or equivalent, including wholesale purchasers and handlers	203	227	230	235

Wholesalers were screened to ascertain whether they met the minimum qualifications for that classification under the order. Numerous changes in the classification were necessary.

During the year the Marketing Agreement and Order was amended to include all types of hog-cholera vaccines within its provisions. Legal action was instituted against 12 producers who failed to have 40 percent of their previous year's sales on hand May 1, 1954. Principals in eight of the cases prosecuted were fined \$50 to \$100 each. Four cases are still pending. Three individuals and three firms were fined \$150 to \$500 each for violations of the price-posting provisions of the order. One case investigated during the year has been referred to the Office of the General Counsel for appropriate action. The Control Agency also amended its rules and regulations to conform to the amendments to the Marketing Agreement and Order. Additional amendments have been proposed by the Control Agency petitioning the Secretary for a hearing in the future relating to them.

MEAT INSPECTION

Current activities: Federal meat inspection assures clean, sound and wholesome meat for human consumption, free from adulteration, and truthfully labeled. The work consists of inspection of animals and of carcasses at the time of slaughter; inspection at all stages of preparation of meat and meat-food products to assure sanitary handling; destruction of condemned product to prevent its use for human food; enforcement of measures that insure informative labeling; inspection of meat and meat-food products offered for importation; and a system of certification to assure acceptance of domestic meats in foreign trade. Meat and meat-food products are examined for compliance with specifications of governmental purchasing agencies; reimbursements are received for the cost of such services. Reimbursements are also received from meat packing establishments for the cost of overtime work performed at their request. Continuous inspection of the manufacture of process or renovated butter is also included under this activity.

Selected Examples of Recent Progress:

1. The scope of operations under the meat inspection laws is indicated by the following tables:

Meat Inspection Activities

	At Close of Fiscal Years				
	1953	1954	1955	1956	1957
Number of establishments covered	991	1,067	1,120	1,154	1,196
Number of cities and towns in which establishments were located	393	410	435	468	495
Antemortem inspection:					
Animals passed	92,365,921	90,733,945	98,011,332	98,309,000	101,098,900
Animals suspected	224,962	188,806	183,505	185,000	190,000
Animals condemned	7,810	6,181	5,560	6,000	6,100
Total animals inspected	92,598,693	90,928,932	98,200,397	98,500,000	101,295,000
Postmortem inspection:					
Carcasses passed	92,302,113	90,640,616	97,913,097	98,212,000	101,005,900
Carcasses condemned	208,624	281,974	281,664	282,000	283,000
Total carcasses inspected	92,590,737	90,922,590	98,194,761	98,494,000	101,288,900
Inspection of animals by species:					
Antemortem inspection (animals)					
Cattle	15,208,023	18,479,229	18,728,579	18,600,000	18,700,000
Calves	6,027,449	7,480,146	7,601,035	7,500,000	7,600,000
Sheep and lambs	13,623,394	14,368,902	14,489,397	14,475,000	14,200,000
Goats	22,803	53,094	86,662	86,000	85,000
*Horses	321,545	250,295	237,478	230,000	220,000
Swine	57,395,479	50,297,266	57,057,246	57,609,000	60,490,000
Total	92,598,693	90,928,932	98,200,397	98,500,000	101,295,000

	Fiscal Year			
	1953	1954	1955	(Estimated) 1956 (Estimated) 1957
<u>Inspection of animals by species-Cont.</u>				
Postmortem inspections (carcasses)				
Cattle	15,204,998	18,475,936	18,725,455	18,597,300
Calves	6,026,786	7,479,329	7,601,035	7,499,200
Sheep and lambs	13,622,745	14,368,314	14,488,712	14,474,600
Goats	22,803	53,093	86,659	85,575
*Horses	321,519	250,282	237,462	229,975
Swine	57,391,886	50,295,636	57,055,438	57,607,350
Total	92,590,737	90,922,590	98,194,761	98,494,000
				101,288,900

*Horses are slaughtered and their meat is identified as such. It is handled and prepared in separate establishments from those handling cattle, calves, sheep, swine and goats.

Meat and Meat Food Products Prepared and Processed
Under Federal Inspection by Fiscal Years

Fiscal Year	Pounds
1953	15,976,408,330
1954	14,833,471,229
1955	16,373,853,029
1956 (est)	16,600,000,000
1957 (est)	17,000,000,000

Meat and Meat Food Products Prepared and Processed under Supervision
Classified by Type of Product

	Fiscal Year 1953 (Pounds)	Fiscal Year 1954 (Pounds)	Fiscal Year 1955 (Pounds)
Placed in cure:			
Beef	119,620,712	136,094,809	164,672,208
Pork	3,505,135,890	3,093,765,867	3,451,336,426
Other	1,461,761	2,203,569	1,957,685
Smoked and/or dried:			
Beef	49,781,137	56,013,138	60,244,221
Pork	2,427,698,106	2,139,975,927	2,439,226,080
Cooked meat:			
Beef	66,642,332	66,032,830	73,101,077
Pork	315,865,497	263,174,996	307,671,355
Other	3,517,822	3,091,667	4,966,107
Sausage:			
Fresh finished	212,385,044	201,932,522	221,700,872
To be dried or semidried	126,065,241	126,633,460	130,224,210
Frankfurters, weiners.	541,517,541	555,346,197	583,978,872
Other	616,045,275	615,002,760	615,356,815
Loaf, headcheese, chili con carne	198,602,990	196,715,686	199,550,183
Steaks, chops, roasts ..	659,777,173	633,492,264	647,475,136
Meat extract	3,419,120	3,152,777	2,351,403
Sliced bacon	792,788,643	713,408,005	870,459,413
Sliced, other	61,042,926	88,967,894	124,921,064
Hamburger	132,593,483	188,859,297	146,647,548
Miscellaneous meat products	30,201,281	39,592,579	57,490,791
Lard:			
Rendered	1,914,783,487	1,589,966,136	1,905,963,444
Refined	1,400,872,257	1,250,946,222	1,422,965,360
Oleo stock	113,398,738	112,922,272	114,267,593
Edible tallow	89,914,906	138,296,143	153,329,341
Rendered pork fat:			
Rendered	102,169,035	89,873,300	104,058,865
Refined	68,749,703	55,355,299	62,007,297
Compound containing animal fat	334,887,149	398,489,120	504,920,765
Oleomargarine containing animal fat	30,058,009	31,260,209	36,653,905
Canned products	1,986,742,487	1,988,303,143	1,915,940,600
Horse meat products:			
Cured	6,918,747	6,419,028	7,102,178
Chopped	42,484,934	26,658,687	21,733,926
Edible oil	3,220,804	2,370,053	352,310
Canned horse meat	18,046,100	19,155,373	21,225,979
Total	15,976,408,330	14,833,471,229	16,373,853,029

Examination of Meat and Meat Food Products for Other Government Agencies (Reimbursable)

	Fiscal Year 1953 (Pounds)	Fiscal Year 1954 (Pounds)	Fiscal Year 1955 (Pounds)	(Estimated) Fiscal Year 1956 (Pounds)
Branch of Government				
Department of Agriculture:				
Agricultural Marketing Service .	- - -	- - -	22,787	108,000
Commodity Credit Corporation....	- - -	76,426	9,566,334	8,000,000
Forest Service	- - -	- - -	64,686	80,000
Department of Commerce:				
Civil Aeronautics Administration	43,834	27,640	63,250	80,000
Maritime Administration	- - -	- - -	18,440	35,000
Department of Interior:				
Fish and Wild Life	- - -	- - -	13,403	15,000
Bureau of Indian Affairs	- - -	- - -	8,063	10,000
Department of Health, Education and Welfare:				
Public Health Service	36,717	41,684	364,832	500,000
Department of Justice:				
Bureau of Prisons	59,648	52,964	56,241	62,000
Department of the Army	- - -	- - -	171,356,999	200,000,000
Department of Army Engineers	- - -	- - -	16,000	16,000
Coast Guard	254,493	79,361	48,434	48,000
Marine Corps	164,224	92,578	72,597	72,500
Department of the Navy	396,939,206	352,549,957	280,986,225	300,000,000
General Services Administration ...	- - -	- - -	107,060	200,000
Veterans Administration	3,844,338	2,764,098	21,291,238	24,000,000
All others	992,413	- - -	- - -	- - -
Total	402,334,873 1/	355,684,708 2/	484,056,589 3/	533,226,500

1/ Includes 6,123,560 pounds rejected.

2/ Includes 6,163,807 pounds rejected.

3/ Includes 6,716,356 pounds rejected.

Summary of Samples Examined in Laboratories for Determination of Adulteration or other Objectionable Conditions, Fiscal Year 1955

	<u>Number Examined</u>	<u>Reported Adversely</u>
Meat and meat food product	9,764	1,825
Edible fats and oils	161	12
Binders (cereal, dried skim milk, soya flour)	712	18
Seasonings (spices, flavorings)	3,723	71
Curing materials	1,206	26
Miscellaneous	1,349	59
Samples of animal foods	116	17
Imports	2,041	122
Samples for Army contracts	9,957	---
Miscellaneous for other agencies	56	---
	<u>29,085</u>	<u>2,150</u>

Examination of Labels and Sketches

	<u>Fiscal Year 1954</u>	<u>Fiscal Year 1955</u>
Number of labels and sketches approved	31,340	36,631
Number of labels approved for imported meat .	1,000	920
Number of labels and sketches refused approval	<u>2,158</u>	<u>2,265</u>
Total number of labels and sketches reviewed	34,498	39,816

Inspection of Imported Meat and Meat Food Products

<u>Fiscal Year</u>	<u>Pounds</u>
1953	367,945,231
1954	334,326,990
1955	278,837,336
1956 (Est.)	280,000,000

2. Contamination of meat food products from nuclear explosions studied.
In order to determine the effect of a nuclear explosion on meat, meat food products and ingredients going into their preparation, samples were exposed to an atomic explosion at the Nevada Test Site during the 1955 spring series. The materials exposed consisted of ham, bacon, dried beef, sausage, lard with and without antioxidants, salt, and curing mixtures. The level of induced radioactivity was determined immediately after recovery of the samples and at intervals thereafter. Chemical analyses were also made on the exposed material to determine changes in the vitamin content and chemical structure. Part of the exposed material is now being fed to dogs in a study to determine if it was made unsafe for consumption.

3. During the past year veterinary meat inspectors obtained laboratory confirmation on 1,116 specimens of diseased tissue in connection with examinations and diagnoses made by them at Federally-inspected establishments. 403 of these specimens were submitted of suspected cases of bovine tuberculosis at the request of the Animal Disease Eradication Branch as an aid in their eradication program. The laboratory work on these specimens involved histopathological studies and frequently bacteriological studies and animal inoculation tests. A wide variety of pathological conditions were diagnosed in this way. Bacteriological tests of food products for spoilage and food poisoning organisms also were made.
4. Safety factors determined for canned meat products. Collaborative investigations were conducted with the research departments of two large meat packing organizations to establish certain minimum requirements in canned products required to be labeled "Perishable Keep Under Refrigeration" that would assure development of unmistakable spoilage before dangerous toxins were produced. The findings have formed a basis for further consideration of canning processes which do not include steam pressure sterilization of the closed cans of meat and meat food products.
5. Trichinosis in swine declining. In the absence of a specific test for the diagnosis of trichinosis in swine, exaggerated statements have been published from time to time concerning the prevalence of these parasites in pork in this country. In the general run of farm hogs that come to slaughter in federally inspected establishments, only about 0.6 percent contain trichinae in very small numbers, as a rule. During the year a special study was made of the incidence of trichinae in hogs known to have been fed cooked garbage and slaughtered in a federally inspected establishment. In an area in New England where the incidence of trichinae in hogs in previous year was 10 percent higher, the frequency of infection has gradually declined during the fiscal year so that during the last 4 months of the fiscal year 1955, the average incidence was only 1.37 percent.

Samples of imported meat containing pork from Australia, Germany, Holland, Italy, Poland and Spain were examined for trichinae with negative results.

6. Further observations made with meat containing Sarcocystis (minute muscle parasites) to determine effect on health. These parasites are sometimes small and not detectable by the naked eye. Beef muscle tissue containing Sarcocystis was fed repeatedly to rats and hogs and the animals kept under observation for any untoward symptoms, following the consumption of this meat. The test animals were observed for months. None was affected by the meat.
7. Symptoms determined for indicating infestations of kidney worms in swine. Studies made during the year of the kidneys of swine obtained from pigs infested with the kidney worm, Stephanurus dentatus, showed that pigs so parasitized tend to have infarcts (sharply limited region of necrosis and hemorrhage in an organ) in the kidneys. As the infection progressed the infarcts tended to increase

in incidence. Infarcts were seen in 80 percent of the hogs relatively late in the period of infection whereas in the early infection period only 28 percent of the pigs contained infarcts. The presence of infarcts in swine kidneys should arouse suspicion of the probable existence of kidney worm infection in the carcasses.

(b) Payments to States, Hawaii, Alaska, and Puerto Rico

Appropriation Act, 1956 and Base for 1957	\$24,753,708
Budget Estimate, 1957	<u>29,503,708</u>
Increase (to strengthen and expand research programs of the State agricultural experiment stations as authorized by the Hatch Act, as amended)	<u>+4,750,000</u>

PROJECT STATEMENT

Project	1955	1956 (estimated)	Increase	1957 (estimated)
1. Hatch Act, as amended by the Act of August 11, 1955	\$18,907,603	\$24,253,708	+\$4,750,000(1)	\$29,003,708
2. Agricultural Marketing Act (Title II) sec. 204(b) (August 14, 1946):	500,000	500,000	- -	500,000
Unobligated balance	46,105	- -	- -	- -
Total pay act costs: (P.L. 94)	[7,000]	[29,500]	[+7,300]	[36,800]
Total available or estimate	19,453,708	24,753,708	+4,750,000	29,503,708

INCREASE

5200,000

(1) An increase of \$4,750,000 to strengthen and expand research programs of the State Agricultural Experiment Stations as authorized by the Hatch Act, as amended August 11, 1955.

Need for Increase: The proposed increase is needed to implement additional segments of an expanded and intensified program of agricultural research which is vitally essential in coping with unsolved problems in all phases of the agricultural industry. It is substantiated by clear-cut statements of need in many problem areas, originating at the State level and based on recommendations of numerous State advisory bodies close to the problems. Advanced plans by State experiment stations for new and intensified research place greatest emphasis on the following areas:

1. Increasing efficiency in the processing, handling, and marketing of farm products.
2. Increasing efficiency in livestock production, particularly through improved nutrition practices and more effective disease control.

3. Developing more effective methods for safeguarding and improving soils especially as related to more effective control, conservation, and application of water.
4. Development of more effective and safer practices for controlling plant diseases and insects.
5. Analyzing management aspects of farm operations to insure greater economy and efficiency.

There follows a statement of how the need for additional research in each of these fields relates to the segments of work already undertaken. Of the proposed increase \$3,420,000 would be distributed to States by formula and \$1,187,500 would be allotted to the regional research fund.

Problems in marketing research: Consistent with the provision that not less than 20 percent of any increase granted under the authorization of the Hatch Act, as amended, shall be used for marketing research, preliminary plans for fiscal 1957 place major emphasis on this field.

Under appropriation increases of the past two years, considerable progress has been made in determining the relationship between marketing efficiency and certain causal factors such as size and location of marketing firms, handling methods and channels of distribution. Strides have also been made in the measurement of consumer preferences and in developing improved methods of raising and maintaining the marketable quality of products. Joint economic-engineering studies have pointed the way to significant savings which can be effected by marketing agencies in processing, handling and transporting farm products, many of which can be made without major changes in capital investment or in business ownership and organization.

In addition to some extension of the above and other lines of work already under way, there is an urgent need to emphasize areas which have been relatively neglected. These include studies of:

1. changes needed in marketing organization and structure to more effectively transmit consumer preferences back to producers;
2. institutional and other barriers which hinder the rapid and widespread adoption of marketing improvements by farmers and marketing agencies;
3. economic aspects of grades and standards;
4. factors affecting, and possibilities for minimizing, short time fluctuations in prices received by farmers;

5. analysis of past, present, and alternative government programs and related studies useful in the development of public policies.

Problems of livestock production: Despite the important and relatively rapid progress which has been made in recent years in improving the efficiency of livestock production through the application of research findings, most of the States attach highest priority to the need for still greater research effort in this area. While recent increase in support for research has permitted a marked expansion in large animal breeding research, the number of experimental breeding units and the basic projects aimed at developing more adequate criteria for identifying valuable germ plasm are still far short of being commensurate with the needs of the industry. Substantial expansion of work in this area is proposed.

Significant new leads in the field of animal nutrition have come to light during the past two or three years. This applies particularly to the use of dietary supplements including amino acids, vitamins, antibiotics, drugs, and hormones for stimulating increased growth and production and greater efficiency in feed utilization. This whole area is in an indeterminate state and, in some phases, highly controversial. An expanded program of fundamental research on the mechanism of action of these supplements would evaluate their true worth and answer many of the practical problems in connection with their use. The demand from the industry for reliable information regarding their proper role in animal feeding places the greatest urgency for more research along these lines.

Improving the nutritional status of our population by providing higher quality animal products in our diet requires research on ways of improving the nutritional quality of food products consumed, factors affecting the content and loss of nutrients in foods, and ways of improving the taste appeal of certain products. Tenderizing of meat, for example, could mean additional farm income on most livestock farms.

Animal diseases and parasites continue to be the most serious barrier to a sound efficient livestock production program. In recent years new diseases have appeared with distressing frequency. Their occurrence often has greatly complicated efforts to bring some of the older disease problems under control. A new disease complex of cattle, variously identified as mucosal disease, red nose, etc., has been recognized across the country and is taking a heavy toll in the feed lots in many areas with Colorado being particularly hard hit. Causal factors and means of spread are presently unknown. Major research must be developed on this problem as rapidly as possible. Losses from vibriosis in both sheep and cattle are increasing and research is inadequate. Such old problems as anaplasmosis and urinary calculi in sheep and cattle still have not yielded to solution. Ornithosis of poultry and leptospirosis in cattle are an increasing threat to large

areas. Greater research effort is needed on means of controlling these specific diseases and also the initiation of additional research on such basic problems as the mechanism of the immunological process.

Problems of soil improvement and conservation: The soils of the Nation are continuously being placed under additional production strains. This involves the use of more fertilizer, more equipment traveling over the soils, and problems of irrigation and drainage. Information is not keeping pace with intensified use of soils. More research is needed if the soils are to maintain their productivity, particularly from the standpoint of fertilizer, degree of acidity or alkalinity (pH), texture, irrigation, and drainage. The rapidly expanding use of irrigation emphasizes the importance of basic research on soil-plant-water relationships. Studies are needed in certain areas where tile drainage is not effective. Waterlogging and salt and alkali accumulation are major causes of large areas of land having declined from arable to non-arable classes. Reliable data on the relative productivity of different soils types under different systems of management are usually lacking. There is an increasing demand for this type of information to aid in developing farm plans and for tax equalization. More information on the amount, rate and time of applying plant nutrients for different soils, crops, and weather conditions is needed for efficient crop production. The role of soil microflora and the processes carried out by them and their interactions in the more efficient utilization of plant nutrients need considerable basic study.

Increased funds available for research at the State stations during the past two years have permitted expansion of research on the important problem of supplemental irrigation for humid areas. One important phase of this work that has not yet received attention is that concerning water rights. Few, if any, of the Eastern States have satisfactory legislation concerning individual rights to surface and ground water for irrigation use. This problem will require study before widespread use of supplemental irrigation can occur.

The availability of radioactive minerals for research presents an opportunity to investigate many basic soil and plant nutrition problems. Several stations plan expanded research in this area.

Problems of controlling plant disease and insects: Each year new plant diseases and insect pests become economically important. Chemical treatment to control them poses the problem of residues with all of its attending ramifications. Research in the field of entomology in the past has been largely for applied research. With additional funds it would be possible to undertake needed basic studies of chemical and biological control of insects.

Research in breeding for disease resistance and the evaluation of fungicides for disease control has increased during the past two years. Investigations of the nature and control of stone fruit viruses and of the distribution and prevalence of nematodes were also expanded. In spite of this increase, however, there is urgent need to strengthen research on nematodes and other soil-borne microorganisms as they relate to the development of plant diseases. Basic research is essential to learn and understand the nature of disease resistance and the cause of variations in plant disease producing organisms. To develop more effective fungicides and antibiotics for plant disease control, fundamental research should be expanded to determine how these are translocated within the plant and how they may affect both the plant and the parasite. In addition there is a need to learn if there are residues present on or in plants after the chemicals have been applied that might affect the health of human beings. The nature of plant viruses and how to prevent the spread within the plant should be investigated. With the expansion of grassland agriculture, there is need for more information on the causes and control of the important diseases of forage plants.

Pasture and range improvement may create almost ideal conditions for the increase of pests which may consume most of the expected profit from the improvement. Considerable research has been started on the control of insects and mites that reduce forage production in pastures, ranges and other forage crops, but much more is needed to determine how to economically prevent losses in quantity and quality from insect and mite damage by the use of pesticides and still economically produce farm products that reach the market with pesticide residues safely below the established tolerances.

Basic research on why insects become resistant to insecticides is another area of research that has been strengthened somewhat but needs much further strengthening to determine the cause of the development of this resistance and methods of preventing and overcoming it. Many insects and mite pests have become resistant to one or more of the newer pesticides that gave such phenomenal control when they were first used. This development of resistance continues to spread and has destroyed the usefulness of some of our most economical methods of controlling pests.

Problems of farm management: With agriculture caught between falling prices of products sold by farmers and high and rising prices of commodities purchased and hired farm labor, it is of the utmost importance that producers receive an increased flow of up-to-date information on how costs may be reduced and over-all farm operations rendered more profitable. Farm technology, including new and improved mechanical devices, changes in feeds and fertilizer, cropping patterns, and breeding and handling techniques for livestock, continues to develop rapidly. However, each farmer faces the problem of determining how these may be applied and the extent to which they will pay on his particular farm. Rapid technological development complicates the problem of finding the combination of farm enterprises which will yield the highest net income. Questions to which farmers need answers include:

1. profitable rates of fertilizer application under different prices for fertilizer and product;
2. feasibility of improving existing versus buying or renting additional pasture land;
3. the adapting of barns, silos, machinery, and other equipment in the interest of higher labor efficiency;
4. conditions under which irrigation and drainage may be economically feasible;
5. costs and returns of different methods of irrigation, and many others.

The problems of finding uses for diverted acres which will promote higher farm incomes and proper conservation, and methods of raising levels of living for low-income farmers are of great immediate concern and research on them needs to be expanded.

Other problem areas: While the major portion of the proposed increase would be applied to expanding research in the fields discussed above, significant new work is planned in other areas. In the area of field crop production, more detailed studies are needed of the composition of improved crops as related to feed, food, and industrial uses, and the extent to which the characteristics of these major plants can be changed and improved through genetics and plant breeding. This important area has received relatively little attention to date. Intensification of research on weed control also is planned. In the field of forage crop production more basic research related to the cytology and genetics of forage species is urgently needed to permit acceleration of the breeding program which could lead to better adapted strains and varieties in many regions. At the same time there is a great need for methods whereby vegetative and reproductive phases of forage plants can be controlled and changed at appropriate times.

In the area of horticulture crop production, additional emphasis would be given to the development of improved varieties with higher vitamin and mineral content, to the improvement of production practices and disease and pest control, and to basic research studies on such problems as the influence of temperature and light on plant growth, flowering and fruiting; the relation of plant nutrition to disease susceptibility; and the isolation and identification of growth inhibitors in fruits.

Additional emphasis will be given to the application of scientific and engineering principles in machinery, in conservation, in farm and rural home structures, and in the efficient use of all available sources of energy and power. Increased research is projected on greater utilization of both solar and atomic power for agricultural purposes. There is also need for more concentrated research effort in crop handling, conditioning, storage and feeding.

Expanded research in home economics would emphasize human nutrition to better estimate dietary requirements in terms of present day living, activity, and food habits, food research to include studies of such factors as variety and processing in relation to nutritive value and quality, and textiles and clothing studies to indicate relative durability and consumer acceptability of fabrics of currently available fibers.

Regional Research Fund: The Regional Research Fund authorized by Section 3(c)(3) of the Hatch Act, as amended August 11, 1955, supports cooperative regional research by the State agricultural experiment stations on problems that concern the agriculture of more than one State. Cooperation in the planning and conduct of research on problems concerning two or more States is playing an increasingly important role in the development of sound, well coordinated research programs. The 1956 allotment of \$4,200,000 of Regional research funds represents about one-fourth of the total available for the regional research program. About one-fourth comes from other Federal-grant funds, and one-half from State funds, making an over-all allotment of about \$16,000,000. In recent years, this cooperative research effort has had a markedly beneficial effect on the total research programs of the State stations, since the coordination that has resulted also applies to related research that is not formally organized under the regional program.

The proposed increase includes \$1,187,500 to be used for the support of new regional research projects and for the more adequate support of new research begun in 1956. The new regional projects proposed by the directors of the four regions include:

North Central Region

- Changing patterns of livestock marketing
- Mucosal disease of cattle and sheep
- Effect of large quantity preparation and service on quality and yield of meat, poultry, and vegetables
- Adjustments in dairy farming to meet changing conditions
- Financial security of rural families and means for its advancement
- Pesticide residues

Northeastern Region

- Changes in marketing costs associated with curtailment or expansion in consumer services
- Oak wilt and other diseases of forest and shade trees
- Economics of supplemental irrigation on northeastern farms
- Effect of cultural and cropping practices on occurrence and severity of soil-borne pests
- Control of pests of forage crops
- Forest tree breeding and selection
- Agricultural climatology of the Northeastern States

Southern Region

- Effect of soil microorganisms on soil structure and plant growth
- Control of forest insects
- Market outlets as affected by cotton quality
- Market outlets for meats of various qualities
- Respiratory diseases of fowls
- Farm finance

Western Region

Effect of marketing procedures on quality of products
Marketing the products of farm forests
Marketing long-staple cotton
Economic effects of ground water laws
Toxic residues of pesticides
The role of diet in cholesterol metabolism
Urinary calculi of beef cattle
Alfalfa seed crop losses due to the clover seed chalcid
Root response of plants in relation to soil environment
Environmental factors affecting growth in farm animals

Interregional

National policies for agricultural prices and income. This will involve a careful appraisal of the effectiveness of national programs which are designed to stabilize farm prices and income. It will complement and present a consolidated analysis of the regional studies dealing with separate major farm commodities.

Plan of Action: Of the increase requested, 72 percent, or \$3,420,000 would be distributed to the agricultural experiment stations in each of the States, Hawaii, Alaska, and Puerto Rico in accordance with prescribed formulas in the Act and would be matched in full. Twenty-five percent, or \$1,187,500, would be made available for accelerating the program of regional cooperative research authorized by section 3(c)(3) of the Hatch Act, as amended. Three percent of the increase, or \$142,500, would be available for additional expenses by the Office of Experiment Stations necessary for administration of the increased amount of funds available to the experiment stations, and for coordination of research among the States, and between the States and the Federal Government. It would be used to strengthen the technical staff required to help plan, coordinate, and review the over-all research program, so as to obtain the maximum benefit of the increase.

The relation of the proposed increase to the funds available for fiscal year 1956, is as follows:

	<u>F.Y. 1956</u>	<u>F.Y. 1957</u> <u>(estimated)</u>	<u>Increase</u>
Allotted to States, Hawaii,			
Alaska, and Puerto Rico ...	\$19,549,708	\$22,969,708	+\$3,420,000
Regional research fund	4,200,000	5,387,500	+ 1,187,500
Administration	504,000	646,500	+ 142,500
Total	<u>24,253,708</u>	<u>29,003,708</u>	<u>+ 4,750,000</u>

The estimated distribution of the increase by subject matter fields is as follows:

Field of Research	Estimated Distribution	Percent of Total
Animal Production	\$ 250,000	5.3
Animal Diseases and Parasites	440,000	9.3
Grass and Forage Crop Production	337,000	7.0
Field Crop Production	135,000	2.8
Horticulture and Forest Crop Production	221,000	4.6
Plant Diseases and Insects	598,000	12.6
Soils	205,000	4.3
Water Use and Conservation	322,000	6.8
Farm Mechanization and Structures	322,000	6.8
Economics of Production	459,000	9.7
Marketing and Utilization	1,025,500	21.6
Foods, Human Nutrition, and Home Econ.	293,000	6.2
Administration	<u>142,500</u>	<u>3.0</u>
Totals	<u>\$4,750,000</u>	<u>100%</u>

The distribution of the \$4,750,000 increase to State experiment stations is shown in the following table:

Estimated allotments to State Agricultural Experiment
Station Under the \$4,750,000 Increase requested for 1957

Alabama.....	105,400
Alaska.....	20,803
Arizona.....	29,977
Arkansas.....	87,486
California.....	95,026
Colorado.....	39,618
Connecticut.....	32,034
Delaware.....	23,012
Florida.....	51,770
Georgia.....	109,077
Hawaii.....	27,648
Idaho.....	34,501
Illinois.....	100,771
Indiana.....	87,314
Iowa.....	88,774
Kansas.....	61,256
Kentucky.....	109,055
Louisiana.....	74,237
Maine.....	35,098
Maryland.....	44,063
Massachusetts.....	39,461
Michigan.....	95,411
Minnesota.....	86,241
Mississippi.....	108,851
Missouri.....	96,104
Montana.....	32,859
Nebraska.....	53,985
Nevada.....	20,834
New Hampshire.....	26,301
New Jersey.....	39,057
New Mexico.....	32,878
New York.....	95,929
North Carolina.....	147,815
North Dakota.....	41,531
Ohio.....	114,871
Oklahoma.....	70,809
Oregon.....	45,819
Pennsylvania.....	123,182
Puerto Rico.....	101,607
Rhode Island.....	21,997
South Carolina.....	83,721
South Dakota.....	41,078
Tennessee.....	110,779
Texas.....	147,975
Utah.....	28,469
Vermont.....	28,072
Virginia.....	94,592
Washington.....	52,116
West Virginia.....	68,450
Wisconsin.....	87,555
Wyoming.....	24,731
Total.....	\$ 3,420,000
Regional Research Fund.....	1,187,500
Administration.....	142,500

TOTAL \$ 4,750,000

CHANGES IN LANGUAGE

The estimates include proposed changes in the language of this item as follows (new language underscored; deleted matter enclosed in brackets):

For payments to [the States, Hawaii, Alaska, and Puerto Rico to be paid quarterly in advance where applicable, to carry into effect the provisions of the following Acts relating to agricultural experiment stations:]

[Hatch Act, the Act approved March 2, 1887 (7 U. S. C. 362, 363, 365, 368, 377-379), \$720,000; Adams Act, the Act approved March 16, 1906 (7 U. S. C. 369), \$720,000; Purnell Act, the Act approved February 24, 1925 (7 U. S. C. 361, 366, 370, 371, 373-376, 380, 382), \$2,880,000; Bankhead-Jones Act, title I of the Act approved June 29, 1935 (7 U. S. C. 427-427g), sections 3 and 5, \$2,863,708, and sections 9 and 11 of said Act as added by the Act of August 14, 1946 (7 U. S. C. 427h, 427j), including administration by the Office of Experiment Stations in the United States Department of Agriculture, \$16,800,000, no part of which latter amount shall be used for beginning construction of any building costing in excess of \$15,000; Hawaii, the Act approved May 16, 1928 (7 U. S. C. 386-386b), extending the benefits of certain Acts of Congress to the Territory of Hawaii, \$90,000; Alaska, the Act approved February 23, 1929 (7 U. S. C. 386c), extending the benefits of the Hatch Act to the Territory of Alaska, \$15,000, and the provisions of section 2 of the Act approved June 20, 1936, as amended (7 U. S. C. 369a), extending the benefits of the Adams and Purnell Acts to the Territory of Alaska, \$75,000; Puerto Rico, the Act approved March 4, 1931, as amended (7 U. S. C. 386d-386f), extending the benefits of certain Acts of Congress to Puerto Rico, \$90,000;] agricultural experiment stations to carry into effect the provisions of the Hatch Act, approved March 2, 1887 (7 U. S. C. 362, 363, 365, 368, 377-379), as amended by the Act approved August 11, 1955 (69 Stat. 671), including administration by the United States Department of Agriculture, \$29,503,708, and payments authorized under section 204(b) of the Agricultural Marketing Act, the Act approved August 14, 1946 (7 U. S. C. 1623), \$500,000; in all, [payments to States, Hawaii, Alaska, and Puerto Rico, \$24,753,708] \$29,503,708.

The proposed changes in language delete reference to the several acts and portions of acts which were repealed by the Act of August 11, 1955 (69 Stat. 671). This Act combines all of these laws into one act, which revises the original Hatch Act. These changes shorten and simplify the wording of the item.

It is proposed to delete the language providing that no part of the funds appropriated under the Bankhead-Jones Act, Title I, sections 9 and 11 of the Act approved June 29, 1935, as amended by the Act of August 14, 1946,

shall be used for beginning construction of any building costing in excess of \$15,000. The Hatch Act, as amended, provides that funds appropriated pursuant to the Act shall be available for "the construction, acquisition, alteration, or repair of buildings necessary for conducting research." To retain language which would limit the use for construction of buildings of all funds available under the Act would impose a more rigid restriction than formerly existed, since the funds under section 5 of the Bankhead-Jones Act of 1935 were available without limitation "for the establishment and maintenance of necessary facilities." Furthermore, such a limitation is believed to be unnecessary and might in very limited situations be undesirable. The State experiment stations, under practices of long standing, primarily use their own funds for the construction and repair of buildings and use the Federal funds for the operation of specific research projects which are reviewed and approved by the Department. Such Federal funds as have been used for buildings, have been used primarily for minor construction, alteration, and repairs incident to carrying out these particular research projects, and have not been used for the major, general purpose, research structures which have been erected with State funds. During the 5 year period 1950-1954, inclusive, an average of only 7/10 of 1 percent of the Federal funds provided under the Hatch, Adams, Purnell, and Title I of the Bankhead-Jones Act, as amended, were used for lands and structures, and the average expenditure for these purposes was less than \$2,000.

STATUS OF PROGRAM

General: The appropriation "Payments to States, Hawaii, Alaska and Puerto Rico, ARS" represents the Federal Government's support and encouragement to the State, Territorial, and Puerto Rican agricultural experiment stations which were established as departments of the land-grant colleges pursuant to the provisions of the Hatch Act of 1887.

The State agricultural experiment stations conduct research and experiments along the lines authorized by the act and the complementary acts of the States on the many problems constantly encountered in the development of a permanent and sustaining agriculture and in the improvement of the economic and social welfare of the farm family. Because of differences in the climate, soil, market outlets, and other local conditions, each State has distinct problems of production and marketing of crops and livestock. The farmers in the individual States naturally look to their State agricultural experiment stations for solution of State and local problems, and in recent years have requested increased service to help meet changing conditions.

The research programs of the State stations, to be most effective, include participation in regional and national programs. Joint attack by a group of State stations is the most effective and often the only practical approach to problems of common interest. The stations, to an ever increasing extent, are acting as regional groups to provide cooperative coordinated attacks on problems of regional and national interest. In a similar manner, the research programs of the State agricultural experiment stations and the Department of Agriculture are supplementary and interdependent.

The Federal-grant funds constitute a powerful force in bringing about inter-State cooperation and Federal-State collaboration in the planning and conduct of this over-all program of agricultural research. Therefore, the full impact of the Federal-grant funds cannot be fully evaluated solely on the basis of the amount of funds provided.

Research at the State stations during the fiscal year 1955 included approximately 4,600 specific lines of research financed wholly or in part by Federal-grant funds and about 6,100 lines of research under non-Federal funds.

These lines of research are continued as long as they are productive. Fifteen to 18 percent of the research program passes its point of maximum productivity annually and is replaced by new research on pressing problems.

Consolidation of Basic Legislation: On August 11, 1955, an amendment to the Hatch Act of 1887 was approved (P.L. 352). This amendment has the effect of consolidating into one act the authority contained in 12 different acts and portions of acts authorizing appropriations for the State experiment stations. The Hatch Act, as amended, provides that the distribution to States for fiscal year 1955 shall become a fixed base. It further provides that any sums appropriated in excess of the 1955 level shall be distributed in the following manner:

- 20% shall be allotted equally to each State.
- not less than 52% shall be allotted to each State as follows:
 - one-half in an amount proportionate to the relative rural population of each State to the total rural population of

all States, and one-half in an amount proportionate to the relative farm population of each State to the total farm population of all States. These populations shall be determined by the last preceding decennial census current at the time each such additional sum is first appropriated. This prevents the State allotments from shifting due to changes in relative rural and farm population.

- not more than 25% shall be allotted to the States for cooperative research in which two or more State agricultural experiment stations are cooperating to solve problems of the agriculture of more than one State.
- 3% shall be available to the Secretary of Agriculture for the Administration of this Act.

It retains the requirement for marketing research as it existed in fiscal year 1955 and provides that 20% of the funds appropriated in excess of the 1955 appropriations shall be used for conducting marketing research projects approved by the Department of Agriculture. It also provides that any amount in excess of \$90,000 available for allotment to any State, exclusive of the regional research fund, shall be matched by the State out of its own funds for research, and for the establishment and maintenance of facilities necessary for the prosecution of such research.

The consolidation of appropriations does not include the payments authorized by Section 204(b) of the Agricultural Marketing Act to State agricultural experiment stations for cooperative projects in marketing research.

Distribution of Payments: The following table shows the distribution by State experiment stations of the 1955 fixed base under Section 3b of the Hatch Act, as amended, and the proportionate share of required marketing research:

Station	Total Federal-grant funds	Proportionate share of required marketing research (Sec. 3b)
Alabama	\$ 433,492.22	\$ 52,615.74
Alaska	145,101.05	10,384.46
Arizona	179,317.85	14,964.37
Arkansas	367,970.22	43,666.60
California	422,804.33	47,440.80
Colorado	211,380.69	19,777.43
Connecticut, State	95,035.41	7,995.51
Connecticut, Storrs	95,035.41	7,995.51
Delaware	151,684.50	11,487.52
Florida	263,434.60	25,853.16
Georgia	452,495.70	54,452.12
Hawaii	167,402.74	13,801.97
Idaho	190,396.94	17,222.84
Illinois	433,459.85	50,305.34
Indiana	380,537.47	43,586.84
Iowa	379,161.68	44,316.39
Kansas	291,366.37	30,579.21

Station	Total Federal-grant funds	Proportionate share of required marketing research (Sec. 3b)
Kentucky	\$ 447,415.30	\$ 54,440.50
Louisiana	330,551.37	37,059.30
Maine	197,179.22	17,506.92
Maryland	233,168.39	21,995.83
Massachusetts	222,236.71	19,698.66
Michigan	414,780.76	47,629.51
Minnesota	366,929.74	43,051.90
Mississippi	433,561.28	54,339.08
Missouri	401,529.82	47,975.31
Montana	187,558.23	16,402.93
Nebraska	262,047.80	26,949.33
Nevada	143,875.51	10,400.00
New Hampshire	165,040.40	13,129.27
New Jersey	217,136.26	19,497.08
New Mexico	186,627.30	16,412.38
New York, Cornell	387,034.64	43,099.12
New York, State	43,003.84	4,788.79
North Carolina	583,068.50	73,790.08
North Dakota	217,220.82	20,732.07
Ohio	486,971.01	57,343.91
Oklahoma	325,285.50	35,348.01
Oregon	236,157.27	22,871.56
Pennsylvania	543,557.14	61,492.65
Puerto Rico	402,043.28	50,723.07
Rhode Island	149,507.88	10,979.54
South Carolina	360,807.41	41,793.03
South Dakota	215,964.17	20,505.85
Tennessee	450,504.72	55,301.20
Texas	598,535.57	73,829.69
Utah	171,424.65	14,211.46
Vermont	170,848.78	14,013.35
Virginia	407,631.09	47,220.32
Washington	260,128.80	26,016.07
West Virginia	321,518.00	34,169.84
Wisconsin	375,242.64	43,707.94
Wyoming	157,536.70	12,345.11
Total	15,733,707.53	1,707,216.47
Regional research fund	2,875,000.00	592,783.53
Administration	345,000.00	
Grand total	18,953,707.53	2,300,000.00

Table A shows the distribution of Federal payments to States and non-Federal funds for research at State Agricultural Experiment stations for the fiscal year 1955. Table B shows the distribution of Federal funds for the fiscal years 1955, 1956, and 1957.

TABLE A

DISTRIBUTION OF FEDERAL PAYMENTS TO STATES AND NON-FEDERAL FUNDS
FOR RESEARCH AT STATE AGRICULTURAL EXPERIMENT STATIONS

FISCAL YEAR 1955

STATE	FEDERAL FUNDS		TOTAL FEDERAL FUNDS	NON-FEDERAL FUNDS	GRAND TOTAL
	Hatch Act, as amended	Section 204(b) Agricultural Marketing Act			
Alabama.....	\$ 433,492.22	\$ 6,100.00	\$ 439,592.22	\$ 1,470,027.59	\$ 1,909,619.81
Alaska.....	145,101.05	4,200.00	149,301.05	194,554.27	343,855.32
Arizona.....	179,317.85	4,000.00	183,317.85	550,895.68	734,213.53
Arkansas.....	367,970.22	-----	367,970.22	701,325.46	1,069,295.68
California.....	422,804.33	10,300.00	433,104.33	7,125,083.01	7,558,187.34
Colorado.....	211,380.69	5,000.00	216,380.69	981,366.77	1,197,747.46
Connecticut.....	189,270.95	10,500.00	199,770.95	1,061,449.02	1,261,219.97
Delaware.....	151,684.50	-----	151,684.50	371,985.84	523,670.34
Florida.....	262,621.62	12,985.00	275,606.62	3,420,626.91	3,696,233.53
Georgia.....	452,495.70	20,450.00	472,945.70	1,973,041.74	2,445,987.44
Hawaii.....	167,052.43	-----	167,052.43	568,532.97	735,585.40
Idaho.....	190,396.94	5,000.00	195,396.94	608,024.52	803,421.46
Illinois.....	432,490.20	12,000.00	444,490.20	2,194,829.06	2,639,319.26
Indiana.....	375,061.80	27,500.00	402,561.80	2,427,588.82	2,830,150.62
Iowa.....	379,161.68	46,850.00	426,011.68	2,467,167.86	2,893,179.54
Kansas.....	291,366.37	12,400.00	303,766.37	1,638,069.36	1,941,835.73
Kentucky.....	447,415.30	16,500.00	463,915.30	1,001,563.70	1,465,479.00
Louisiana.....	330,551.37	-----	330,551.37	2,313,527.54	2,644,078.91
Maine.....	197,179.22	17,500.00	214,679.22	325,578.37	540,257.59
Maryland.....	233,168.27	16,500.00	249,668.27	705,519.19	955,187.46
Massachusetts.....	222,236.71	4,000.00	226,236.71	582,220.19	808,456.90
Michigan.....	414,780.76	67,500.00	482,280.76	1,841,643.42	2,323,924.18
Minnesota.....	366,929.74	-----	366,929.74	2,494,932.57	2,861,862.31
Mississippi.....	433,561.28	27,000.00	460,561.28	1,339,877.44	1,800,438.72
Missouri.....	401,529.82	13,000.00	414,529.82	755,248.18	1,169,778.00
Montana.....	187,558.23	-----	187,558.23	874,063.24	1,061,621.47
Nebraska.....	262,047.80	5,000.00	267,047.80	1,376,726.88	1,643,774.68
Nevada.....	143,875.51	-----	143,875.51	101,971.83	245,847.34
New Hampshire.....	165,040.40	-----	165,040.40	175,255.26	340,295.66
New Jersey.....	217,136.26	9,308.00	226,444.26	1,556,838.20	1,783,282.46
New Mexico.....	186,627.30	-----	186,627.30	356,163.48	542,790.78
New York.....	429,934.52	7,200.00	437,134.52	4,346,406.04	4,783,540.56
North Carolina.....	583,068.50	-----	583,068.50	1,721,126.91	2,304,195.41
North Dakota.....	217,220.82	-----	217,220.82	1,092,357.59	1,309,578.41
Ohio.....	486,971.01	11,000.00	497,971.01	2,104,448.67	2,602,419.68
Oklahoma.....	325,285.50	16,000.00	341,285.50	1,516,907.24	1,858,192.74
Oregon.....	236,157.27	17,000.00	253,157.27	1,996,691.45	2,249,848.72
Pennsylvania.....	543,557.14	2,500.00	546,057.14	1,557,370.03	2,103,427.17
Puerto Rico.....	400,434.19	-----	400,434.19	1,313,995.85	1,714,430.04
Rhode Island.....	149,507.88	5,000.00	154,507.88	150,941.74	305,449.62
South Carolina.....	360,807.41	-----	360,807.41	736,020.71	1,096,828.12
South Dakota.....	215,964.17	7,500.00	223,464.17	464,675.42	688,139.59
Tennessee.....	450,504.72	8,200.00	458,704.72	809,648.57	1,268,353.29
Texas.....	598,535.57	15,425.00	613,960.57	3,035,199.09	3,649,159.66
Utah.....	171,424.65	5,000.00	176,424.65	650,742.96	827,167.61
Vermont.....	170,848.78	1,500.00	172,348.78	143,894.53	316,243.31
Virginia.....	407,631.09	3,132.00	410,763.09	1,171,222.89	1,581,985.98
Washington.....	260,128.80	25,450.00	285,578.80	2,226,618.75	2,512,197.55
West Virginia.....	321,518.00	2,500.00	324,018.00	423,026.50	747,044.50
Wisconsin.....	357,333.14	6,500.00	363,833.14	2,700,640.00	3,064,473.14
Wyoming.....	157,536.70	12,500.00	170,036.70	439,871.36	609,908.06
Total.....	15,705,676.38	500,000.00	16,205,676.38	72,157,504.67	88,363,181.05
Regional Research Fund..	2,875,000.00	-----	2,875,000.00	-----	2,875,000.00
Administration.....	326,926.00	-----	326,926.00	-----	326,926.00
Unobligated balance.....	46,105.62	-----	46,105.62	-----	46,105.62
Total.....	18,953,708.00	500,000.00	19,453,708.00	72,157,504.67	91,611,212.67

TABLE B

Distribution by State of Payments to States for Research
Fiscal Years 1955-1957

State	Fiscal Year 1955	Fiscal Year 1956	Fiscal Year 1957 (Estimated)
Payments to States authorized by the Hatch Act as amended:			
Alabama.....	\$ 433,492.22	\$ 551,100.00	\$ 656,500.00
Alaska.....	145,101.05	168,313.00	189,116.00
Arizona.....	179,317.85	212,767.00	242,744.00
Arkansas.....	367,970.22	465,575.00	553,061.00
California.....	422,804.33	528,845.00	623,871.00
Colorado.....	211,380.69	255,588.00	295,206.00
Connecticut.....	189,270.95	225,814.00	257,848.00
Delaware.....	151,684.50	177,362.00	200,374.00
Florida.....	262,621.62	321,222.00	372,992.00
Georgia.....	452,495.70	574,208.00	683,285.00
Hawaii.....	167,052.43	198,253.00	225,901.00
Idaho.....	190,396.94	228,894.00	263,395.00
Illinois.....	432,490.20	545,903.00	646,674.00
Indiana.....	375,061.80	477,963.00	565,277.00
Iowa.....	379,161.68	478,218.00	566,992.00
Kansas.....	291,366.37	359,718.00	420,974.00
Kentucky.....	447,415.30	569,102.00	678,157.00
Louisiana.....	330,551.37	413,387.00	487,624.00
Maine.....	197,179.22	236,311.00	271,409.00
Maryland.....	233,168.27	282,334.00	326,397.00
Massachusetts.....	222,236.71	266,268.00	305,729.00
Michigan.....	414,780.76	521,243.00	616,654.00
Minnesota.....	366,929.74	463,160.00	549,401.00
Mississippi.....	433,561.28	555,021.00	663,872.00
Missouri.....	401,529.82	508,765.00	604,869.00
Montana.....	187,558.23	224,222.00	257,081.00
Nebraska.....	262,047.80	322,285.00	376,270.00
Nevada.....	143,875.51	167,122.00	187,956.00
New Hampshire.....	165,040.40	194,387.00	220,688.00
New Jersey.....	217,136.26	260,716.00	299,773.00
New Mexico.....	186,627.30	223,313.00	256,191.00
New York.....	429,934.52	537,078.00	633,007.00
North Carolina.....	583,068.50	748,005.00	895,820.00
North Dakota.....	217,220.82	263,561.00	305,092.00
Ohio.....	486,971.01	615,147.00	730,018.00
Oklahoma.....	325,285.50	404,296.00	475,105.00
Oregon.....	236,157.27	287,280.00	333,099.00
Pennsylvania.....	543,557.14	681,007.00	804,189.00
Puerto Rico.....	400,434.19	515,420.00	617,027.00
Rhode Island.....	149,507.88	174,050.00	196,047.00
South Carolina.....	360,807.41	454,224.00	537,945.00
South Dakota.....	215,964.17	261,799.00	302,877.00
Tennessee.....	450,504.72	574,115.00	684,894.00
Texas.....	598,535.57	763,561.00	911,536.00
Utah.....	171,424.65	203,190.00	231,659.00
Vermont.....	170,848.78	202,172.00	230,244.00
Virginia.....	407,631.09	513,179.00	607,771.00
Washington.....	260,128.80	318,280.00	370,396.00
West Virginia.....	321,518.00	397,895.00	466,345.00
Wisconsin.....	357,333.14	472,939.00	560,494.00
Wyoming.....	157,536.70	185,131.00	209,862.00
Total.....	15,705,676.38	19,549,708.00	22,969,708.00
Regional Research Fund....	2,875,000.00	4,200,000.00	5,387,500.00
Administration.....	326,926.00	504,000.00	646,500.00
Unobligated balance.....	46,105.62	--	--
Payments authorized for Marketing Research, Section 204(b), Agricultural Marketing Act 1/.....	500,000.00	500,000.00	500,000.00
Total.....	19,453,708.00	24,753,708.00	29,503,708.00

1/ Allotted to States by projects on the basis of recommendations by a committee of experiment station directors and approved by the State Experiment Stations Division, Agricultural Research Service.

Selected Examples of Recent Progress.

1. Digestive factor of ruminants identified.--Biochemists at the Ohio Agricultural Experiment Station have identified a previously unknown factor that helps ruminants (sheep and cattle) digest the fiber or cellulose material in hay. Animal scientists have known for some time that high-quality roughage, such as alfalfa and clover, steps up rumen activity and brings faster gains. Using an artificial cow's stomach, the Ohio scientists learned that the factor most responsible was valeric acid, one of the short-chained fatty acids. Its use increased digestive activity nearly 300 percent. Several other short-chained fatty acids - isobutyric, isovaleric, and caproic acids - shows similar activity but to a lesser degree. Actual feeding trials are now under way with sheep to learn whether the finding has practical value in feeding ruminants.
2. Wheat breeding research in Kansas effective.--More than 75 percent of the 1954 Kansas wheat acreage was planted to Pawnee, Comanche, Wichita, Ponca, and Kiowa varieties. These varieties were developed largely through a single Federal-grant project at the Kansas experiment station, conducted in cooperation with the Department. Research under this project was begun 20 years ago, and it still serves as the basis for breeding high-yielding, better quality Kansas wheat. Two new promising varieties bred with funds available through this project were approved for increase in 1955 and distribution will be made to growers in the near future.
3. Conservation profitable.--Changing to a soil-conserving system of farming is profitable in the long run, although an income waiting period is necessary before the operator realizes full advantage, the Iowa Experiment Station has shown. For a 160-acre farm in Southwestern Iowa, and based on a fixed price level, in the years following change to the soil-conserving system, it was estimated that income would drop \$387 the first year because oats were substituted for corn; \$242 the second year because hay was substituted for corn; and only \$122 the third year because livestock and increased crop yields were beginning to pay off. By the fourth year volume of livestock and higher yields would begin to show profit, bringing an increase of \$469 over the income received under the old system. This figure would rise to \$804 during the fifth year, and the long-run average increased income would be \$1,039, showing that the low-income waiting period of the first 3 years more than paid off.
4. Retention of anhydrous ammonia influenced by soil moisture.--In Missouri, the State experiment station has pointed the way for farmers to save nearly a quarter million dollars annually by applying anhydrous ammonia when soil conditions are right. The research showed that the retention of anhydrous ammonia, a gaseous nitrogen byproduct of the oil industry now used widely as a fertilizer, is influenced by soil moisture and methods of application. The ammonia is satisfactorily retained by soils when applied at optimum moisture content (15 to 18 percent on a silt loam). Losses are high when applied to very dry or very wet soil. Also, ammonia loss is rapid immediately after application when placed only 3 inches deep in a dry soil. The loss is gradual from a wet soil. Measurements show that when applied to wet soils in liberal amounts (100 pounds per acre in 40-inch rows) the soil cannot absorb these amounts. As the moisture evaporates from the surface, ammonia is in

solution and is lost. Application should be at least 6 inches below the surface with applicator knives closer together to reduce concentration in areas of release.

5. Chemical tests made to determine pesticide residue.--In 10 years of chemical tests made of a variety of pest-control materials, the California station has not found a single case of harmful residues left on edible food products when the material was properly applied. More than 30,000 analyses were made of more than 20 of the pesticides used in California agriculture. The amounts of residue permitted on edible crops by law are minute. For example, citrus fruits may not be sold if they contain one part per million of parathion (one pint in six railway tank carloads) in orange juice. Actually, the residue on food sold is far below the legal limit - 1/10th or 1/100th or less of what the law permits. Methods worked out by the California station will, in some cases, detect the equivalent of one pint of insecticide in 6,000 carloads of food.
6. Progeny test developed for better beef.--More than 3,500 beef animals have been subjected to a standard test developed by the Texas experiment station in cooperation with the Department. The test reveals inherited growth factors of beef animals. Such elements as genetic heritability, blood factors, mating of animals with high gaining characteristics, and others are taken into account. Use of the information already developed makes it possible for a ranchman to increase the rate of gain in cattle from one-half pound to a pound of beef a day. The research entering into the test program includes some of the most fundamental studies in animal science. While more than one factor controls the gaining rate of beef cattle, station scientists are confident that they are on the threshold of finding a chemical blood test that will provide a simple formula for revealing efficiency of gain in individual animals.
7. Local markets help determine part-time enterprises.--The Black Belt Branch of the Mississippi Experiment Station demonstrated how research workers and farm operators can cooperate in developing profitable part-time enterprises suited to market demands in a given area. It was determined that demand for turkeys in the local markets of the Brooksville area exceeded production. An experimental program conducted over a five-year period indicated that up to 1,000 additional turkeys could be marketed in the area with an average net profit of \$2.23 per bird by using scientific management. An added advantage is the fact that broiling chickens can follow the turkeys in the same brooder house. The average net profit from the broilers ranged from 7 to 13 cents per bird.
8. Electrical instrument developed for measuring backfat.--The Indiana experiment station has developed a simple electrical instrument (the "Lean-Meter") for distinguishing between muscular and fatty tissues of hogs and other meat animals. Fat is a relatively poor conductor of electricity, while muscle and blood are excellent conductors. Indiana scientists made use of this principle by using a slender needle containing appropriate electrodes and connecting it with a suitable measuring device. The instrument has two important applications. It helps breeders identify and select desirable breeding stock. It also promises to become

a handy instrument for quick grading of hogs and other animals on the basis of backfat thickness. No disinfectant or sterilizer is needed at the measurement site and the meter quickly registers the grade of the animal.

9. Stored wheat highly sensitive to moisture content.--The fact that a sizable amount of commercially stored wheat could be saved by proper sampling methods from a condition known as "sick wheat" was demonstrated in research at the Minnesota experiment station. In commercial elevators where probe sampling indicated that there was an average moisture content of 13 percent, some portions of the bulk wheat had a moisture content above 14 percent and occasional spots had a moisture content of 15 to 16 percent. This was far above the critical point favorable for the development of certain fungi. Although there is little penetration of the wheat kernels prior to harvest, such fungi as *alternaria* are often present in the seed. At moisture contents of 13.5 and 14.5 percent the kernels are invaded by a slow-growing strain of *Aspergillus glaucus* which requires special techniques for detection. This fungus principally invades the germ. Once seed is heavily attacked by storage molds it is more susceptible to later deterioration than grain that is low in these molds. Results of this research emphasize the need for extensive sampling of commercial bulk storage of grain for moisture range fluctuation, and many commercial elevator firms plan to sample all of their larger bins at regular intervals.
10. Costs lowered in field handling of citrus.--The Florida experiment station found that in orchards with a volume of about 200,000 boxes of citrus, reducing hand labor to a minimum can contribute materially to lowered cost of handling citrus from tree into highway trucks. The "tractor-basket" method (in which a giant-size basket is operated on a hydraulic lift mounted on a tractor) showed a great advantage over hand handling of field boxes and a slight advantage over other mechanized methods. The cost of moving citrus from the tree into highway trailers by the tractor-basket method was 2.7 cents per field box, compared with 6.8 cents for the field-box hand-handling method. The tractor-basket method was lower than the other mechanized systems because of the ease of unloading. It is estimated that 25 percent of Florida processed citrus fruit for the 1954-1955 season was handled by tractor-basket at a saving of about \$267,000 to those who adopted this method.
11. Milk protein interactions affect product quality.--By learning more about the interactions of various milk proteins, Wisconsin dairy researchers have made possible more rapid research toward better dairy products such as canned sterile milk concentrate, nonfat dry milk solids, dried whole milk, and dairy products manufactured from such materials. For instance, when they learned that high-heat treatments caused a complex protein to form from part of the casein and lactoglobulins, they were able to change the cottage-cheese-making procedure enough to produce good quality cottage cheese using nonfat milk solids. Under normal cottage-cheese-making procedures, high-heat solids were unsatisfactory. The discovery of this type of protein interaction draws a line between desirable and undesirable heating treatments for products of various kinds. Since the complex protein harms the curd-forming properties of casein, high heat isn't desirable for products to be used in cottage-cheese making. But since the complex protein is more stable, high heat favors stability of other types of products, such as concentrated canned sterile milk.

12. Market demands quality potatoes.--Studies by the Maine agricultural experiment station under funds made available under section 204(b) of the Agricultural Marketing Act demonstrate that there is a definite and large potential demand for high quality potatoes, and that the potato industry will be repaid for the costs involved in making a quality product available to consumers. Through interviewing consumers on the Boston market, it was found that they prefer to buy U. S. Fancy potatoes at prices up to 73 cents per 10-pound bag to unwashed potatoes at 43 cents per 10-pound bag. When the U. S. Fancy potatoes were sold at 53 cents as compared with 43 cents for regular potatoes, consumers preferred the higher quality pack at a ratio of 2 to 1. These findings should aid in motivating the industry into grading potatoes to meet the demands of its various customers.
13. More services needed by livestock feeders.--Data collected and analyzed by the Ohio agricultural experiment station for 45 local feed mills in 38 Ohio counties show that the average local mill is outdated and lacking in necessary facilities and equipment to meet the growing needs of the farmer feeder. Efforts to perform more services with lack of modernization has lead to the inefficient use of labor and higher costs for the majority of these local mills. These results, which point to important methods of improving local feed mill facilities, are being made available to local feed mill managers and boards of directors and the public. The studies were made under funds available under section 204(b) of the Agricultural Marketing Act.

Regional Research Fund: For the conduct of research in which two or more State agricultural experiment stations are cooperating to solve problems that concern the agriculture of more than one State, there is available the "Regional Research Fund" authorized by Section 3(c)(3) of the Hatch Act, as amended, (formerly Section 9(b)3 of the Bankhead-Jones Act). This fund amounted to \$2,875,000 in 1955 and \$4,200,000 in 1956. Of the sums appropriated in excess of the 1955 level, not more than 25% is allotted to this fund. Allotments are made to stations on the basis of projects recommended by the Committee of Nine established by the Act to represent the State stations.

Following are examples of work carried on in 1955 under this fund:

1. Methods developed for determining pesticide residues.-- The North Central States' regional research has developed methods to determine pesticide residues on raw agricultural products and occurrence of the residues. The agricultural experiment stations of 4 States in the north-central region (Kansas, Michigan, Ohio, and Wisconsin) have begun research on the effects of residues from some of the generally used insecticides on typical soils and the effects of specific insecticides on different soil types under varying weather conditions. Early results show that plants grown in sandy soil treated with high concentrations of insecticides are affected most, while the opposite holds for muck soils. Three types of responses were identified: (1) no response; (2) the higher the concentration of the insecticide, the higher the stand, growth, and yield; (3) the higher the concentration of the insecticide, the poorer the stand and the lower the yield. Bacteriological studies showed appreciable decreases in soil microorganisms in plots treated with high concentrations of insecticide and differences in effect on soil microorganisms correlated with soil type.

2. Some causes and prevention of breeding failures found.--Regional research undertaken by the Northeastern experiment stations has established some previously unknown facts concerning the causes and prevention of reproductive failures in dairy cattle. The Pennsylvania and New York (Cornell) stations learned that a low level of nutrition slows up sexual maturity in both heifers and bulls, and that above-normal feed intake hastens maturity and reproductive activity. The Pennsylvania station found that the time of onset of semen production in young bulls is not affected by changing the source of protein from vegetable to animal or vice versa. Through this regional research it has become widely recognized that the addition of the antibiotic streptomycin to bull semen minimizes the danger of spreading a disease known as vibriosis through artificial insemination. Studies at the Connecticut (Storrs) station resulted in improved diagnostic methods for detecting Vibrio fetus infection. However, antibiotics failed to prove effective as a treatment for the condition in heifers and cows known as granular vaginitis. According to the Pennsylvania station, repeated breeding failures of heifers were related to early death of the embryo. The regional studies have also resulted in learning more about the control of ovulation, making hormonal therapy more practical in remedying functional fertility. A mobile laboratory is being used in New York State to survey practical breeding operations in an effort to learn how management affects breeding efficiency.
3. Control of oak wilt looks promising.--Results of a regional study conducted cooperatively by the north-central States and the Department indicate considerable promise for local control of oak wilt. Poisoning of oaks with an efficient weed killer in a 50-foot band around all infected trees prevented further spread of the wilt. The Ohio station has shown that lumber from trees killed or infected with oak wilt is safe to use after a reasonable holding period. Tests demonstrated that high temperature and low moisture content of the wood are unfavorable for survival of the oak-wilt fungus. Lumber salvaged from diseased trees and racked during the summer months has sufficient treatment to render it safe for use without spreading the fungus to uninfected oak areas. These findings have been instrumental in preventing foreign embargoes that might have hindered the lumber industry had they been imposed. To learn how oak wilt is spread, insects that were known to frequent and feed on the mats of the oak-wilt fungus were dipped in a solution of radioactive iodine by Pennsylvania station scientists. This study determined at what temperature and moisture the insects were most active and the type of tree wound inhabited by the insects. Infections take place through these openings. It was shown that fungus mats of oak wilt attracted insects released 1 mile away. The oak-wilt fungus was isolated from the insects after 107 days in storage at approximately 50° F.
4. Field packing of western lettuce promotes efficiency.--A western regional study has shown that certain shifts are taking place in the commercial production of head lettuce. Field packing and vacuum cooling in the Salinas Valley of California has increased from 20 percent of the crop in 1952 to about 75 percent of the crop in 1954. This study, in which the California and Arizona experiment stations cooperated with the Agricultural Marketing Service of the Department, points the

way to improved field packing as a major element in reducing costs of shipping lettuce to eastern markets. In an economic-engineering study of field operations, it was shown that field packing costs varied with the work method used, the wage plans in effect, and harvest density. With the ground-pack method, where an hourly wage plan was used and the harvest density was 200 cartons per acre, the total cost of labor and equipment for harvesting, packing, loading, and hauling to the pre-cooler area was an estimated 22.7 cents per carton. With the machine-pack method, total cost was 21.1 cents per carton. With the trailer-pack method, total cost was 23.4 cents per carton. With a harvest density of 100 cartons per acre, the unit costs would be about 25 percent higher and with a harvest density of 250, about 6 percent lower than at the 200-carton density. On the basis of findings made in these extensive field studies, present mechanized equipment is being redesigned with an expected 20 percent reduction in packing costs.

5. New marketing practices improve quality of eggs and poultry.--A number of improved marketing practices for eggs and poultry have grown out of regional research undertaken by the north-central State experiment stations. The Iowa station proved that thermostabilization in oil did the best job among all treatments tested of maintaining interior quality and preventing weight losses of shell eggs in storage. The Missouri station prevented spoilage in soiled shell eggs by immersing the eggs for 3 minutes in water held at 145° F. Soiled white eggs were cleaned with sodium perborate to make them look as attractive as clean-layed eggs. The Ohio station reduced the number of bacteria on clean-looking eggs from 81,000 bacteria per shell to 8,000 by using a detergent-sanitizer. An egg-washing machine equipped with a rubbing device was found to be more efficient than one which sprayed or bubbled the detergent-sanitizer over the eggs. Dressed poultry cooled off more rapidly in ice water agitated with air than in air or water alone in Michigan station research. Frozen birds held at 60° F. thawed twice as fast as those held at 40° F. The Minnesota station demonstrated that poor bleeding at slaughter has a bad effect on the appearance of frozen, thawed, or cooked broilers, although it does not affect the flavor adversely. A dosage of carbon dioxide in the killing process for turkeys will increase the percentage of blood lost. In a study relating types of feed to turkey-meat quality, the South Dakota station found that turkey feeds of low fiber content or containing antibiotics do not have detrimental effects upon carcass composition.
6. U. S. potato breeders aided by foreign plant material.--Potatoes from foreign countries have played a large part in the improvement of American potatoes since 1932, when the Department released a variety called Katahdin. Federal and State potato breeders have developed 66 varieties since then, and sixty of these have at least one foreign potato selection in the pedigree. About 62% of the U. S. certified potato-seed acreage was planted to the new varieties in 1954, with old varieties claiming 38%. Only six years earlier, these percentages were reversed. The U. S. Potato Introduction Station at Sturgeon Bay, Wisconsin, has had a lot to do with speeding up potato breeding, making it easier and more assured of success. At Sturgeon Bay, hundreds of plants from 80 species are growing, available to potato breeders all over the nation

and in foreign countries. Last year, 16 States, two Territories, and 19 foreign countries received seed or tubers from the station, operated cooperatively by the Wisconsin Experiment Station, the Department, and agricultural experiment stations of the 48 States. Many selections have been found resistant to late blight, bacterial wilt, scab, verticillium wilt, and potato viruses, as well as having certain desirable horticultural characteristics. This screening gives a wide selection of possible breeding material.

7. Milk processing and distribution costs can be reduced.--One of the barriers to increased milk consumption and better returns to dairy farmers is the high cost of processing and distributing fluid milk. In seeking ways to lower this barrier in Southern States, the agricultural experiment stations of Alabama, Arkansas, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Texas undertook a regional milk-marketing study in cooperation with the Agricultural Marketing Service. Considerable differences in similar operations were found in an analysis of cost data in 16 different fluid processing and distributing plants. Costs of glass containers varied among plants because of differences in breakage and loss. Costs of paper containers showed little variability among plants on a per unit basis. Equipment costs varied greatly. Executive salaries and distribution labor were the most variable of the wage and salary costs. Office labor and plant labor costs showed less variability, indicating that most plants utilize labor more efficiently in these departments. It was shown that costs can be reduced for several operations by increasing volume up to 15,000 quarts daily. Beyond this point other factors appeared to affect cost variability more than volume. This regional study showed that inefficiencies in most instances could be corrected by (1) improving the plant layout and arrangement of equipment, (2) removing bottlenecks caused by inefficient equipment, (3) full utilization of present equipment and labor, (4) increasing volume of plants and replacing inefficient equipment with more efficient equipment, and (5) improving the distributing organization. The breakdown of costs was as follows: Salaries and wages, 42 percent; containers, 15 percent; vehicles, 12 percent; supplies, 11 percent; equipment, 7 percent; and other, 13 percent.

(c) Foot-and-Mouth and Other Contagious Diseases
of Animals and Poultry, Agricultural Research Service

	Research	Eradication Activities	
		Foot-and-mouth disease	Vesicular exanthema of swine
Appropriation Act, 1956	\$1,900,000	a/	c/
Proposed supplemental, 1956 for pay act costs	45,000	--	--
Base for 1957	1,945,000	a/	c/
Budget Estimate, 1957	3,993,000	b/	c/
Increase (for operation of research program in newly con- structed facilities at Plum Island, New York)	<u>+2,048,000</u>	<u>--</u>	<u>--</u>

PROJECT STATEMENT

Project	1955	1956 (estimated)	Increase or Decrease	1957 (estimated)
1. Eradication activi- ties:				
a. Eradication of foot-and-mouth disease	\$1,367,175	--	--	--
b. Eradication of vesicular exanthema of swine	2,081,975	d/ 2,165,000	c/	c/
Total eradication activities	3,449,150	2,165,000	c/	c/
			(1):	
2. Research	1,731,604	1,945,000	+2,048,000	3,993,000
Unobligated balance	79,921	--	--	--
Total pay act costs (P.L. 94)	[55,600]	[160,000]	[-67,000]	[93,000]
Total available or estimate	5,260,675	4,110,000	+2,048,000	3,993,000
Reappropriation of prior: year balance	-1,021,169	-197,413		
Unobligated balance transferred from:				
"Agricultural con- servation program, Agriculture"	-1,197,481	--		
"Grants, farm housing, Farmers Home Adminis- tration, Agriculture":	-500	--		

(Continued on next page)

Project	1955	1956 :(estimated)
Transferred to		
"Salaries and Expenses;		
Agricultural Research:		
Service"	+88,475	- -
Reimbursements from		
Commodity Credit		
Corporation	-1,230,000	-1,967,587
Proposed supplemental		
due to pay increases...	- -	-45,000
Appropriation or		
estimate	1,900,000	1,900,000

- a/ It is not anticipated that any transfers will be required in 1956 or 1957 unless there is an outbreak of foot-and-mouth disease in the United States or adjacent countries.
- b/ An appropriation estimate for 1957 in the amount of \$1,269,330 to cover unreimbursed expenses and transfers from Commodity Credit Corporation through June 30, 1955, including interest through June 30, 1956, is proposed under the item, "Reimbursements to Commodity Credit Corporation for advances for animal disease eradication activities." This item is explained elsewhere in these justifications.
- c/ Eradication activities to be financed by transfers from other accounts (Commodity Credit Corporation) as authorized in the annual appropriation act. Transfers limited to \$2,250,000 in 1956 and proposed at not to exceed \$1,550,000 in 1957.
- d/ Amount excludes transfer of \$12,000 for fiscal year 1956 to the appropriation, "Salaries and Expenses, Agricultural Research Service, research" under the authority of section 702(b) of the Department of Agriculture Organic Act of 1944 for research to support the vesicular exanthema eradication program.

INCREASE

RESEARCH

- (1) An increase of \$2,048,000 for the operation of the research program in the newly constructed facilities at Plum Island, New York.

Need for Increase: Foot-and-mouth disease is a constant threat to the livestock industry of the United States since it exists in most countries of the world. Vigilant enforcement of laws and regulations designed to protect the United States against invasion by this disease has been an excellent defense, although on six occasions since 1900, the disease has been introduced into the country. These outbreaks have been successfully dealt with by slaughter of infected and exposed animals.

In the last several years, however, the disease has encroached successively in the Western hemisphere in Mexico, Colombia, Venezuela, Canada and Martinique. Its presence in Mexico and Canada in recent years has presented a particular threat to the United States livestock industry because land barriers are not effective against its spread. It is estimated that an uncontrolled, widespread outbreak of the disease in the United States at this time could result in the loss of as much as one-fourth of the normal supplies of meat, milk and other important animal products.

Congress recognized the serious economic consequences which might result from an outbreak of foot-and-mouth disease, and in the Act of April 24, 1948 (21 U.S.C. 113a) authorized the establishment of facilities for conducting research on the disease in this country. Funds were provided for the construction of new facilities on Plum Island, New York, and in addition, facilities surplus to the Chemical Corps there were transferred to the Department of Agriculture July 1, 1954, for research purposes.

Additional funds will be needed in 1957 to operate the new facilities, which will be completed about March, 1956. The new facilities will approximately quadruple the transferred facilities now in use. They will provide units in which research can be conducted simultaneously on at least four different types or strains of the foot-and-mouth virus. The former Chemical Corps Laboratory provides facilities for research on only one type or strain of virus at any one time, thus limiting research studies.

Present research is confined to development of diagnostic tests and to virus propagation techniques. The expanded program to be undertaken in the new facilities with the additional personnel provided by the proposed increase would include urgently needed research on genetics of the virus, host adaptation of the virus, and mechanics of infections, resistance to infection, and antibody production; the problem of carrier animals; experimental production and testing of vaccine; antibiotic and virucidal studies, etc. All of these phases of work are of vital importance in prevention, control and eradication of foot-and-mouth disease.

Because of the island location and the necessity for safety precautions, a comparatively large staff of engineers and operating personnel is required for operation of steam and emergency power plants, sewage and air decontamination equipment, carcass incinerators, and other special facilities peculiar to the installation. A guard force is required for enforcement of the safety regulations designed to prevent escape of the disease agents under study. The requisite safety precautions are implemented through special facilities for introduction of materials into the laboratories.

Colonies of guinea pigs, mice and other laboratory animals are maintained for experimental purposes. Large animals such as cattle, swine and sheep are also required. These are first impounded in isolated pre-experimental quarantine units to assure freedom from external parasites or extraneous disease before being introduced into the laboratories.

The research conducted at Plum Island since June 1954 in the facilities transferred from the Chemical Corps, provides encouragement that a successful research program can be conducted with the full use of the new laboratory facilities. In addition to (1) testing the research facilities to make certain that the safety features incorporated in the building and the operational procedures were adequate, (2) training personnel in the techniques involved in these particular disease studies and (3) developing valuable information relating to the virus of vesicular stomatitis, a promising lead has been developed for the economical production of foot-and-mouth disease vaccine from cultures produced in bovine and swine kidneys from healthy, slaughtered animals. If this work is successful, a single bovine kidney may produce cultures which would yield as much virus as could be harvested from several hundred cattle inoculated in the tongue by the present method.

Plan of Work: The new facilities make possible the operation of a sound research program to study contagious animal diseases and to develop information needed for the control or eradication of these diseases. The program includes provision both for diagnostic facilities for rapid and positive identification of diseases, and for research on foot-and-mouth and other contagious diseases which would include:

1. Investigation of improved diagnostic procedures.
2. Improvement of the methods of artificial cultivation of viruses.
3. Studies of various types and strains of viruses.
4. Investigation of modes of transmission of viruses.
5. Search for improved methods of disinfecting contaminated premises and materials.
6. Studies of relative susceptibility of different species, breeds, and classes of animals and their role in the perpetuation and spread of disease.
7. Investigations directed toward development of more effective vaccines.
8. Fundamental studies of chemical and physical properties of viruses.

ERADICATION ACTIVITIES

A. Eradication of Foot-and-Mouth Disease

On December 31, 1954, Mexico was declared to be free of foot-and-mouth disease. It is not anticipated that funds will be required to be transferred from the Commodity Credit Corporation for this activity in fiscal years 1956 or 1957 unless there is an outbreak of foot-and-mouth disease in the United States or adjacent countries. A standby program is being maintained in Mexico, financed from the appropriation "Salaries and Expenses, Agricultural Research Service, plant and animal disease and pest control."

The principal function of the small staff in Mexico in fiscal year 1956 will be to observe the animal disease situation, and be in a position to act promptly should an outbreak occur. It will also serve as the United States section of the Mexican-United States Commission for the Prevention of Foot-and-Mouth Disease. There is some equipment still on loan to the Commission for use in case of an emergency.

The Mexican-United States Commission for the Prevention of Foot-and-Mouth Disease will continue to operate throughout fiscal year 1956. An agreement has been reached for the Mexican government to contribute 5,000 pesos per month toward Commission costs, in addition to the June 30, 1955 Commission balance. The Mexican contribution of 60,000 pesos (about \$4,800) in fiscal year 1956, together with the June 30, 1955 balance of about 897,989 pesos (\$72,500) proceeds from sale of Commission property, will be sufficient to defray costs, which will be largely for field and laboratory examinations of suspected cases of foot-and-mouth disease.

B. Eradication of Vesicular Exanthema in Swine

For 1956, transfers of funds for the vesicular exanthema program are being made as follows:

"Commodity Credit Corporation" \$1,967,587

Unobligated balances in 1955 for:

"Eradication of foot-and-mouth disease" .. 29,000

"Eradication of scrapie of sheep" 388

"Eradication of vesicular exanthema of
swine" 168,025

2,165,000

It is estimated that under current conditions not more than \$2,165,000 will be needed for this program, of which \$1,935,000 will be used for operating expenses and \$230,000 for indemnities.

No reduction is anticipated during the current year in the present level of the program. This level is required to enforce properly interstate regulations to prevent the spread of the disease, for controlling the movement of garbage-fed swine, and for adequate premise inspection.

It is estimated that operating expenses and indemnities can be reduced for fiscal year 1957 to \$1,550,000, provided the decrease in infection continues. The infection during 1955 has been confined to California and South Carolina but no infection has been reported in South Carolina since February 1955. However, there is always the threat that the disease may appear in States having a large incidence of raw-garbage feeding. At the present time there are 8 States in which there are still comparatively large numbers of swine fed raw garbage, namely, New Jersey, Texas, Massachusetts, Pennsylvania, Connecticut, Vermont, New Mexico, and Virginia. Six of these States have laws or regulations, but they are not being fully enforced.

The disease has existed in California for 23 years and the premises here could be well seeded with the infection. Even though more than 95 percent of the swine in the State are being fed cooked garbage, infected herds are being found monthly. California does not have funds available to pay indemnity for infected and exposed swine. In the absence of funds, California has not required that such hogs be slaughtered and specially processed.

The premises in California are in the process of being cleaned and disinfected in hope that this will decrease the incidence of infection. However, initial work indicates that this will not be the complete answer and that further steps are necessary. It may be necessary to purchase all known infected and exposed swine and require that they be specially processed.

The prompt payment of indemnities for the expenses of purchase, destruction and disposition of animals and materials required to be destroyed because of being contaminated by or exposed to vesicular exanthema is important in the operation of a successful control program. Indemnity payments have been shared with States on a 50-50 basis for many years, although since fiscal year 1954 there has been no legislative requirement for states to match the Federal funds before such payments would be made. Serious results have sometimes followed delays in making indemnity payments because of lack of funds in States. The Department, therefore, revised its regulations on November 10, 1955 to provide that upon agreement of the authorities of a State to enforce quarantine restrictions and orders and directives properly issued in the control and eradication of vesicular exanthema, the Department could cooperate with the State in the control program and pay up to 50 percent of the indemnity even though State funds were not available. It is anticipated that this will expedite the disposal of swine infected or exposed to vesicular exanthema in California and result in a more effective eradication program in that State. Infection in California is at one of its lowest ebbs, so that the time appears opportune to attempt to eradicate the remaining centers of infection.

The current estimates do not provide for the possibility of a substantial change in the California program in fiscal years 1956 or 1957.

The following table reflects the financing of the program for eradication of vesicular exanthema since its initiation in the fiscal year 1953:

Obligations Under Funds Transferred for Control of Vesicular
Exanthema in Swine, Fiscal Years 1953-1957 a/

Fiscal year 1953:

Transferred from:

Operating and Administrative Expenses, Federal Crop Insurance Corporation, 1953	\$1,052,200
Control of Emergency Outbreaks of Insects and Plant Diseases, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, 1953	500,000
Salaries and Expenses, Bureau of Animal Industry, Agricultural Research Administration, 1953	175,000
Control of Forest Pests, Agriculture, 1953	172,800
Salaries and Expenses, Soil Conservation Service, 1952 - December 31, 1953 (flood restoration)	208,000
Total available, 1953	<u>2,108,000</u>
Less obligations, 1953	<u>1,752,386</u>

Fiscal year 1954:

Balance available from fiscal year 1953	\$ 355,614
Transferred from:	
Grants, Farm Housing, Farmers Home Administration, Department of Agriculture	122,252
Conservation and Use of Agricultural Land Resources, Production and Marketing Administration, 1952 - December 31, 1953 (flood restoration)	<u>2,172,134</u>
Total available, 1954	<u>2,650,000</u>
Less obligations, 1954	<u>1,597,981</u>

Fiscal year 1955:

Balance available from fiscal year 1954	1,052,019
Transferred from:	
Grants, Farm Housing, Farmers Home Administration, Department of Agriculture	500
Conservation and Use of Agricultural Land Resources, Production and Marketing Administration, 1952 - December 31, 1954 (flood restoration)	<u>1,197,481</u>
Total available, 1955	<u>2,250,000</u>
Less obligations, 1955	<u>2,085,125</u>

Fiscal year 1956:

Balance available from fiscal year 1955 (Vesicular Exanthema)	164,875
Balances available from other eradication activities, fiscal year 1955	32,120
Anticipated transfers from Commodity Credit Corporation ..	<u>1,968,005</u>
Total estimated available, 1956 (as authorized by the Acting Secretary of Agriculture August 22, 1955)	<u>2,165,000</u>
Less estimated obligations, 1956	<u>2,165,000</u>

Fiscal year 1957: b/

a/ Transfers made under authority granted to the Secretary in annual appropriation acts to provide funds for emergencies threatening the livestock or poultry industry of the country. In addition, direct obligations in the amount of \$460,647 were incurred in fiscal year 1953 under the appropriation Salaries and Expenses, Bureau of Animal Industry, Agricultural Research Administration, 1953. Through fiscal year 1955, transfers totalled \$5,600,367.

b/ It is anticipated that funds for expenses in 1957, not to exceed \$1,550,000 will be derived by transfer from capital funds of the Commodity Credit Corporation.

SUMMARY OF ERADICATION COSTS

	<u>Actual</u> <u>1955</u>	<u>Estimated</u> <u>1956</u>	<u>Estimated</u> <u>1957</u>
1. Eradication of foot-and-mouth disease			
(a) Cooperation with Government of Mexico in control, eradication, and prevention of foot-and-mouth disease	\$948,427	- -	- -
(b) Mexican border inspection and quarantine.....	<u>418,748</u>	<u>- -</u>	<u>- -</u>
Subtotal	<u>1,367,175</u> a/	<u>- -</u>	<u>- -</u>
2. Eradication of vesicular exanthema of swine	<u>2,081,975</u>	<u>2,165,000</u>	<u>1,550,000</u>
Total	<u>3,449,150</u>	<u>2,165,000</u>	<u>1,550,000</u>

a/ Excludes estimated interest cost of \$71,215.

STATUS OF PROGRAM

RESEARCH

Initiation of Program: Foot-and-mouth disease research was initiated on Plum Island, New York, in facilities transferred to the Department of Agriculture by the Department of the Army, July 1, 1954. Research on this disease was authorized by the Act of April 24, 1948 (21 U.S.C. 113a).

The two Departments had been jointly engaged in research on Plum Island for a short period of time prior to the transfer of these facilities. The joint work was terminated June 30, 1954, and the facilities, valued at about \$5,000,000, were declared excess to Department of the Army needs. The transfer of these facilities by the Army enabled the Department of Agriculture to undertake some of the urgently needed research at once instead of waiting for completion of the facilities being constructed by the Department.

Current research: The first experiments at the Plum Island (New York) Animal Disease Laboratory were with vesicular stomatitis, in order to test the laboratory and its equipment before commencing work with foot-and-mouth disease. This disease was selected because it is very similar to, and may be confused with, foot-and-mouth disease, and any additional information about it would be helpful if foot-and-mouth disease should invade this country. The following are examples of significant progress in research on vesicular stomatitis:

1. Methods of identifying types of vesicular stomatitis virus, developed very largely at Beltsville, have been standardized.
2. The conglutination test has been adapted to the diagnosis of vesicular stomatitis. This is a simpler test than that being used at present.
3. A relatively cheap, easy, and practical method of growing vesicular stomatitis virus in both bovine and guinea-pig kidney cells from healthy slaughtered animals has been worked out. This makes it possible to produce large quantities of this virus without inoculating living animals. This is an important discovery, since an ample supply of virus contributes materially to the ease and progress of research with virus diseases.
4. It has been found that the virus of vesicular stomatitis produces marked and typical changes in kidney cells in which it grows. These changes are readily seen if microscopic examinations are made.
5. Vesicular stomatitis in human beings has been studied and reported. For the first time the virus was isolated from a human, in whom it produces a relatively mild disease.
6. Studies of the comparative susceptibility of several species of animals to vesicular stomatitis virus have shown that embryonating eggs, chickens, and unweaned mice, are quite susceptible to the virus, while guinea pigs are more resistant. These studies give a background for selecting laboratory animals for use in research with this disease.

After thorough testing of the laboratory and its equipment, research on foot-and-mouth disease was undertaken. Foot-and-mouth disease virus has been grown in both cattle and swine kidney cells in the laboratory. Kidneys obtained from healthy slaughtered animals are a cheap and readily available source of such cells. A single kidney from a cow may produce as much virus as can be harvested from several cattle inoculated in the tongue. If virus grown in kidney cells proves satisfactory for the production of foot-and-mouth disease vaccine, the cost of this product may be reduced very materially.

ERADICATION ACTIVITIES

1. Cooperation with the Government of Mexico in the control and eradication of foot-and-mouth disease continues. On July 1, 1954, the program in Mexico was projected on agreements reached at a meeting of the Mexico-United States Commission for the Prevention of Foot-and-Mouth Disease held on April 6 and 7, 1954. These agreements included removal of an outer quarantine line encircling the working zone, reduction in the frequency of animal inspections, and initiation of a program of publicity and orientation among cattlemen in the States lying between the northern and southern quarantine lines of 1950. These agreements resulted in sharp reductions in commission personnel, and the rearranging of working schedules to insure inspections of all susceptible animals in the working zone every 15 days.

This program remained in effect until December 1954, when another commission meeting resulted in the following agreements:

- a. Routine inspection of animals to be discontinued.
- b. Surplus Commission property to be sold.
- c. Personnel to be reorganized to permit observation and orientation with a smaller force.
- d. Mexican Government's monetary contributions to the Commission to be reduced.

These agreements resulted in further sharp reductions in personnel.

Emphasis was placed on the organization of vigilance committees in all communities to report animals suspected of foot-and-mouth disease without delay, and on orientating the cattlemen of the region with respect to foot-and-mouth disease. On June 30, 1955, a very small number of employees remained with the Commission.

During fiscal year 1955, Commission personnel conducted 3,759,073 inspections of suspected animals, of which 123 were veterinary inspections of suspicious animals. All proved negative for foot-and-mouth disease.

Total vehicles disinfected	28,744
Total premises cleaned and disinfected	11,193

2. Mexican Border Quarantine. During the period July to December 1954, the number of employees engaged in border patrol work was gradually reduced, due to the favorable disease outlook in Mexico. The patrol was deactivated in its entirety as of December 31, 1954, with the border reopened on January 1, 1955. One hundred and twenty-eight prohibited animals, and approximately 25,000 pounds of prohibited meats, hay, and straw, were seized and destroyed due to illegal entry in these six months.

The maximum number of patrol personnel reached a peak of 219 employees during May 23, 1953 to December 31, 1954, the period of the second recent outbreak of foot-and-mouth disease in Mexico. In addition, the patrol was supplemented by the aerial patrol (on contract basis) which proved very effective in detecting livestock movements in isolated areas along the border, and alerting ground personnel in time to prevent, or more quickly apprehend, prohibited animals crossing the border. Import inspection activities are being financed from the appropriation, "Salaries and Expenses, Agricultural Research Service, plant and animal disease and pest control."

The accompanying tables summarize the cost of the program for control, eradication and prevention of foot-and-mouth disease for the years 1947-1955 and show the status of funds as of June 30, 1955 of the Mexican-United States Commission for the Prevention of Foot-and-Mouth Disease.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE

CONTROL, ERADICATION AND PREVENTION OF FOOT-AND-MOUTH DISEASE

Obligations and Funds Provided as of June 30, 1955

Obligations	F.Y. 1947 - 1954 (Accumulative)	F.Y. 1955	Total
<u>Control, eradication and prevention activities</u>			
Payments made to the Mexican- United States Commissions for: the Eradication and Prevention: of Foot-and-Mouth Disease in: Mexico	\$ 59,603,635	\$ 237,000	\$ 59,840,635
Direct Federal expenses for program in Mexico	32,433,719	711,427	33,145,146
Enforcement of Mexican border quarantine	13,709,291	418,748	14,128,039
Inspection at public stock- yards and in the field to detect immediately any possible introduction of foot-and-mouth disease into the United States	1,251,068	- -	1,251,068
Short-term research on foot- and-mouth disease	905,186	- -	905,186
Protective measures to prevent: entry of foot-and-mouth dis- ease from Canada	675,744	- -	675,744
Total	108,578,643	1,367,175	109,945,818
<u>Meat purchase program in northern Mexico:</u>			
Purchase of canned meat and meat products in northern Mexico	56,173,509	- -	56,173,509
Administrative expenses incident to meat purchase ...	443,534	- -	443,534
Handling charges (canned meat)	3,314,335	- -	3,314,335
Total	59,931,378	- -	59,931,378
<u>Interest on Funds borrowed from CCC</u>	2,278,179	71,215	2,349,394
TOTAL OBLIGATIONS	170,788,200	1,438,390	172,226,590
Deduct: Application of gross receipts from sales of canned meat and from inspection fees	-36,916,018	- -	-36,916,018

Obligations	F.Y. 1947 - 1954 (Accumulative)	F.Y. 1955	Total
NET TOTAL OBLIGATIONS (NET OF RECEIPTS FROM SALE OF MEAT) ...	133,872,182	1,438,390	135,310,572
<u>Funds Provided</u>			
By CCC:			
Gross transfers of funds	149,518,000	1,230,000	150,748,000
Interest costs on funds trans- ferred, and handling charges, canned meat	5,589,045	71,215	5,660,260
Total	155,107,045	1,301,215	156,408,260
Transfers available in sub- sequent years	- 166,175	+ 166,175	XXX
Net total	154,940,870	1,467,390	156,408,260
Less:			
Application of gross receipts : from sales of canned meat and: from inspection fees	-36,916,018	- -	-36,916,018
Repayment of funds transferred: from appropriations therefor.:	-64,962,685	-226,212	-65,188,897
Cancellation of Commodity Credit Corporation Notes authorized by 1952, 1953, and: 1954 Department of Agriculture Appropriation Acts and Public: Law 295, approved February 12, 1954	-53,062,167	- -	-53,062,167
Unreimbursed transfers	- -	1,241,178	1,241,178
<u>BY APPROPRIATIONS AND CANCEL- LATIONS OF NOTES</u>	133,929,852	226,212	134,156,064
Net total funds provided	133,929,852	1,467,390	135,397,242
Unobligated balances:			
Net available in subsequent year--transferred to Treasury:	- 57,670	- -	- 57,670
Available as of date of report:	- -	- 29,000	- 29,000
Total	- 57,670	- 29,000	- 86,670
NET TOTAL OBLIGATIONS (AS ABOVE):	133,872,182	1,438,390	135,310,572

Statement of Mexican-United States Commission for
the Prevention of Foot-and-Mouth Disease 1/

As of June 30, 1955

	<u>Pesos</u>	<u>Pesos</u>
Payments to the Commission:		
By the United States	34,983,222 2/	
By Mexico	<u>2,565,967 3/</u>	37,549,189
Income from sale of expendable property to be credited to United States and Mexican section accounts		67,874
Less expenses of Commission		<u>36,347,162</u>
Net:		
Cash (less Mexican accounts payable withholding tax, employee's bond deposits and income and expenses on sale of liquidation property to be paid to the Mexican Government)	73,656	
Cash account of United States Section of Joint Commission -- proceeds of sale of canning and rendering plant 750,000 pesos, and income from sale of surplus property 560,140 pesos, available for future pay- ments by the United States to the Joint Commission	897,989 4/	
Receivables	11,469	
Equipment	<u>286,787</u>	<u>1,269,901</u>

- 1/ Because of variations in the rate of exchange this statement is made in pesos.
- 2/ Includes 152,373 pesos contributed from proceeds of sales of equipment owned by the Eradication Commission; excludes expendable property carried on the Commission's books at a value of 132,104 pesos.
- 3/ Includes 19,721 pesos contributed from proceeds of sales of equipment owned by the Eradication Commission. This has also been reduced by 39,840 pesos income from sale of surplus property of the Prevention Commission returned to the Mexican Government.
- 4/ Represents 412,151 peso reduction due to application of funds by the United States Section to Commission expenses.

3. Eradication of vesicular exanthema of swine. During fiscal year 1955 vesicular exanthema was found in six States--California, Illinois, Louisiana, New Jersey, South Carolina, and Virginia. During the period January 1, to June 30, 1955, the infection was reported in California during each month, and in South Carolina during February.

The disease situation in California presents the greatest problem as there is no requirement that infected and exposed swine be slaughtered and specially processed; consequently, there are recovered swine on some of the premises which may continue to carry the virus. Since the disease has been present in California for more than 20 years, the premises are undoubtedly heavily contaminated.

This disease is spread chiefly by the feeding of raw garbage. In June 1954, approximately 41 percent of the swine being fed garbage in the country were being fed raw garbage, in contrast to June 30, 1955, when only 17 percent of the swine were being fed raw garbage. During fiscal year 1955, 59,800 swine were infected with or exposed to vesicular exanthema as compared to 209,200 in fiscal year 1954.

In fiscal year 1956, the program is designed to:

- a. Overcome the disease eradication problem in California where the disease sometimes recurs on previously infected premises.
- b. Decrease the raw-garbage-feeding in New Jersey, Texas, Massachusetts, Pennsylvania, Connecticut, Vermont, New Mexico, and Virginia, and to develop a control and eradication program in Texas and Connecticut.
- c. Strengthen the enforcement of the programs in Massachusetts, New Jersey, Pennsylvania, and New Mexico.
- d. Continue to keep the programs in other States at their present high level of control.

The following table shows the costs of this program by fiscal years since an emergency was declared on August 1, 1952:

	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1956</u> <u>(Est.)</u>	<u>1957</u> <u>(Est.)</u>
Operating expenses:					
Enforcement	\$ XX	\$ 742,750	\$1,669,065	\$1,658,000	\$1,189,000
Diagnosis	XX	378,600	13,479	37,000b/	21,000b/
Additional inspections at stockyards	XX	221,542	237,500	240,000	240,000
Total operating ...	550,554	1,342,892	1,920,044	1,935,000	1,450,000
Indemnities	<u>1,662,479</u>	<u>255,089</u>	<u>165,081</u>	<u>230,000</u>	<u>100,000</u>
Total	<u>2,213,033a/</u>	<u>1,597,981</u>	<u>2,085,125</u>	<u>2,165,000</u>	<u>1,550,000</u>

a/ Does not include indirect costs at public stockyards or at serum plants for overtime, communication services, etc. Does include \$460,647 made available under "Salaries and Expenses, Agricultural Research Service."

b/ These amounts represent estimated costs involved in making the differential diagnosis of conditions suspected as being vesicular exanthema.

The following table shows Federal indemnities paid and the number of swine slaughtered in those states:

<u>F. Y. 1955</u>		
<u>States</u>	<u>Animals Slaughtered</u>	<u>Federal Indemnity Paid</u>
Iowa	6,128	\$ 76,049
Louisiana	377	4,906
Oregon	299	3,887
South Carolina	3,311	40,386
Texas	2,174	28,256
Virginia	348	4,523
Interstate shipments	<u>7,074</u>	<u>7,074</u>
	<u>12,637</u>	<u>165,081</u>

The attached table and charts illustrate the progress of the vesicular exanthema eradication program.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE

NATIONAL STATUS ON CONTROL OF GARBAGE-FEEDING OF SWINE
as of November 30, 1955

State	Premises feeding garbage	Swine fed garbage	Premises feeding cooked garbage	Swine fed cooked garbage	Swine fed raw garbage	Semi- Monthly inspection of premises
Alabama	648	19,735	643	19,642	93	100%
Arizona	123	11,257	107	10,953	304	100%
Arkansas	411	15,662	346	14,903	759	83%
California	547	232,458	545	232,094	364	100%
Colorado	106	44,919	106	44,919	0	92%
Connecticut	156	21,668	36	5,578	16,090	53%
Delaware	33	2,396	33	2,396	0	100%
Florida	834	44,880	783	44,076	804	99%
Georgia	599	27,996	569	25,855	2,141	96%
Idaho	114	6,311	114	6,311	0	100%
Illinois	238	31,552	238	31,552	0	100%
Indiana	116	14,321	116	14,321	0	90%
Iowa	87	12,363	87	12,363	0	100%
Kansas	303	16,769	303	16,769	0	100%
Kentucky	380	14,545	375	14,488	57	97%
Louisiana	647	19,437	647	19,437	0	100%
Maine	167	12,764	161	12,690	74	80%
Maryland	161	16,362	135	15,359	1,003	99%
Massachusetts	573	146,794	519	140,717	6,077	89%
Michigan	138	21,076	138	21,076	0	12%
Minnesota	119	17,556	119	17,556	0	100%
Mississippi	223	11,973	220	11,923	50	99%
Missouri	112	23,789	112	23,789	0	100%
Montana	31	4,963	31	4,963	0	100%
Nebraska	80	8,852	80	8,852	0	100%
Nevada	40	4,337	40	4,337	0	95%
New Hampshire	111	8,555	83	7,789	766	87%
New Jersey	420	219,403	93	132,683	86,720	84%
New Mexico	75	5,506	20	1,291	4,215	81%
New York	303	35,403	302	35,267	136	94%
North Carolina	988	39,560	988	39,560	0	94%
North Dakota	13	1,536	13	1,536	0	73%
Ohio	689	38,181	689	38,181	0	76%
Oklahoma	531	19,182	495	18,710	472	99%
Oregon	42	7,566	42	7,566	0	100%
Pennsylvania	278	64,413	263	60,254	4,159	78%
Rhode Island	66	10,527	65	10,523	4	95%
South Carolina	1,075	22,102	1,049	21,863	239	89%
South Dakota	60	4,469	51	4,469	0	76%
Tennessee	621	24,714	614	23,842	872	71%
Texas	1,036	66,484	124	21,556	44,928	2%
Utah	37	5,019	32	4,543	476	83%
Vermont	71	5,832	55	4,614	1,218	97%
Virginia	667	41,443	348	38,643	2,800	93%
Washington	121	15,399	115	14,937	462	98%
West Virginia	271	10,635	270	10,582	53	100%
Wisconsin	81	12,889	81	12,889	0	100%
Wyoming	33	3,997	30	3,989	8	100%
TOTAL	14,575	1,467,550	12,425	1,292,206	175,344	17 - 100% 31 - less than 100%

85% of premises feeding cooked garbage
88% of swine being fed cooked garbage
12% of swine being fed raw garbage
32 States reported 90% to 100% semi-monthly inspections

INFECTION REPORTED DURING MONTH OF NOVEMBER

California - 2 premises involving 5,100 animals

V.E. INFECTED-EXPOSED SWINE

THOUS.

160

120

80

40

0

152,395

90,714

25,659

33,124

13,351

4,708

5,324

19,763

8,231

9,162

6,250

20,100

6,300

458

JJ O J A J O J A J O J A J O J A J O

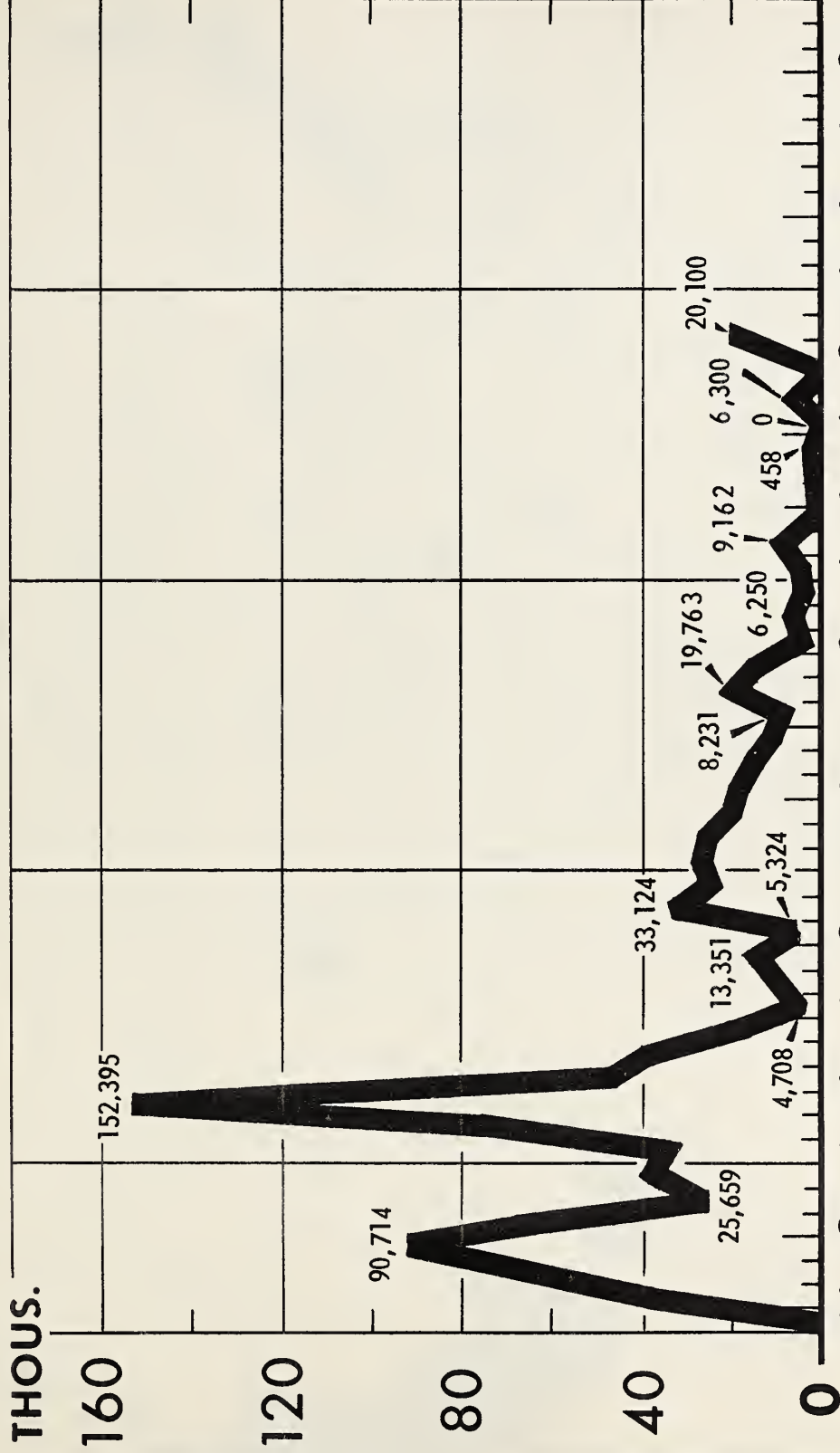
1952

1953

1954

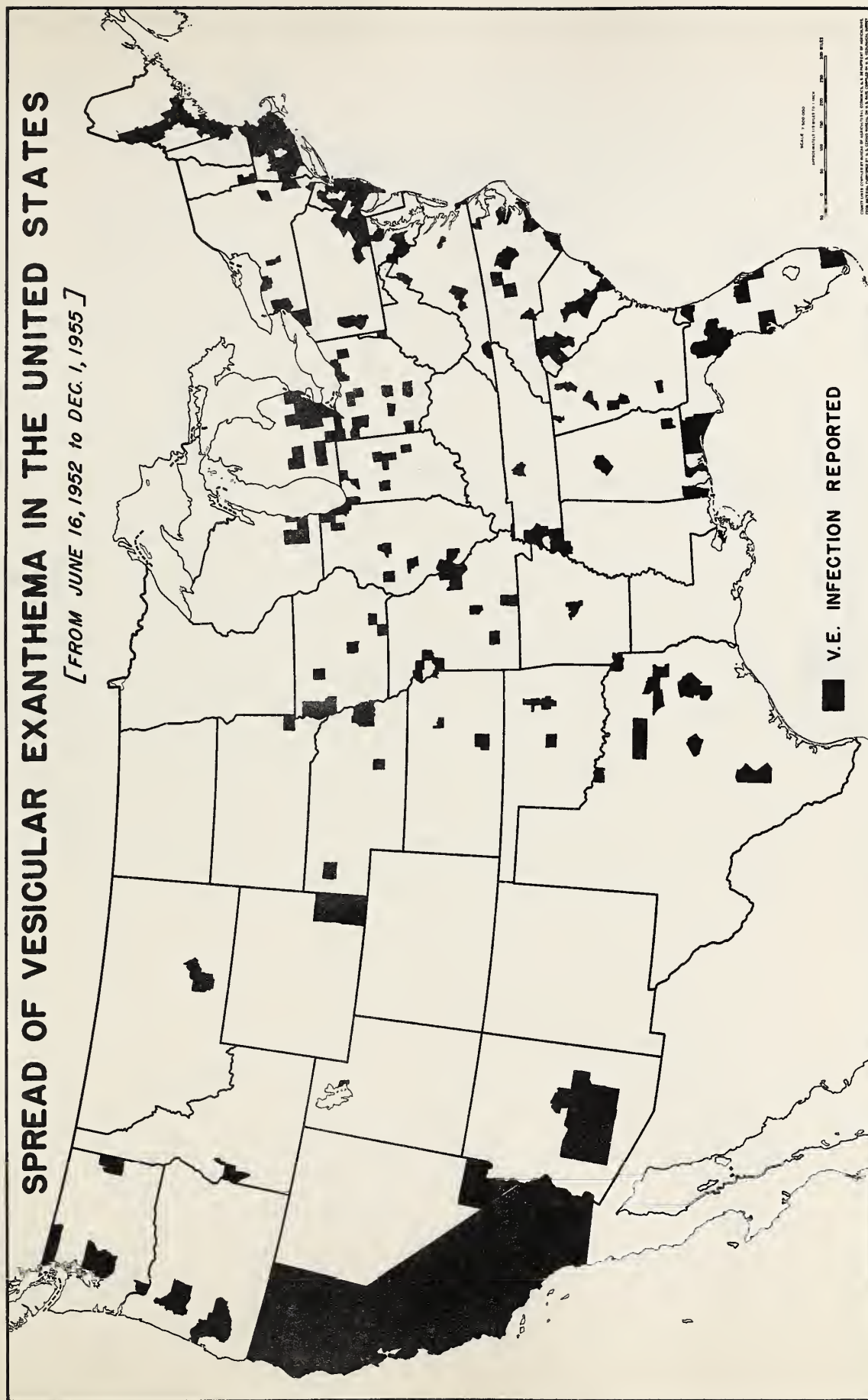
1955

1956



SPREAD OF VESICULAR EXANTHEMA IN THE UNITED STATES

[FROM JUNE 16, 1952 to DEC. 1, 1955]



■ V.E. INFECTION REPORTED

SCALE 1:500,000
APPROXIMATELY 1 INCH = 100 MILES

CONTENTS: CONTAINS MAP OF UNITED STATES, SHOWING V.E. INFECTIONS REPORTED FROM JUNE 16, 1952, TO DEC. 1, 1955. MAP IS A REPRODUCTION OF A MAP PUBLISHED BY THE U.S. DEPARTMENT OF AGRICULTURE.

V.E. IN THE U.S.

DEC. 1, 1955

Under quarantine
Partly quarantined



(d) Animal Disease Laboratory Facilities

Appropriation Act, 1956, and base for 1957	\$ 250,000
Budget Estimate, 1957	- -
Decrease (due to elimination of non-recurring amount provided in 1956 for surveys, plans and specifications for constructing or altering animal disease research and control laboratory facilities)	<u>-250,000</u>

PROJECT STATEMENT

Project	:	1955	:	1956 (estimated):	:	Decrease	:	1957 (estimated)
Surveys, plans, and specifications	:	- -	:	\$250,000	:	-\$250,000	:	- -
Total pay act costs (P.L.94)	:	[- -]	:	[600]	:	[-600]	:	[- -]

STATUS OF PROGRAM

The Supplemental Appropriation Act, 1956, approved August 4, 1955, provided \$250,000, to remain available until expended, for surveys, plans, and specifications for animal disease research and control laboratory facilities.

For many years work with live organisms of diseases transmissible to man has been housed in the East Wing of the Department's Administration Building in Washington, D. C., but on July 1, 1955, this work was suspended because of the hazards to the health of those engaged in the work. Nearly all of the work suspended in Washington has been transferred to Beltsville except the production of tuberculin used in the cooperative eradication program with the States.

A general review of facilities at Beltsville, Md., Auburn, Ala., and Denver, Colorado, has also been made. All work with live organisms transmissible to man has been suspended at Auburn, Alabama, and Denver, Colorado, and will not be resumed there. This work has also been transferred to Beltsville.

In order to provide adequate space incorporating necessary protective measures, there is urgent need to provide additional facilities and to recondition present facilities.

The Department is now engaged in developing preliminary plans and drawings and estimates of cost of the facilities which are required for this research and control work in order that estimated costs will be available for submission of estimates to Congress early in the calendar year 1956.

CHANGE IN LANGUAGE

The estimates propose deletion of language for this item as follows:

[For preparation of plans and specifications for construction of facilities for animal disease research and control, and for surveys to determine the cost of acquiring and altering facilities which may be made suitable for such work, including employment pursuant to the second sentence of section 706 (a) of the Organic Act of 1944 (5 U.S.C. 574), as amended by section 15 of the Act of August 2, 1946 (5 U.S.C. 55a), \$250,000, to remain available until expended.]

This change deletes the non-recurring language contained in the Supplemental Appropriation Act, 1956, approved August 4, 1955, which provided \$250,000 for surveys, plans, and specifications for alterations and construction of facilities for animal disease research and control, to be available until expended. Preliminary plans and drawings for altering and constructing facilities are now being prepared.

(e) Research Facilities

PROJECT STATEMENT

Project	1955	1956 (estimated)	1957 (estimated)
Facilities for research on foot-and-mouth and other diseases of animals...	988,117	1,067,454	- -
Unobligated balance brought forward...	-2,055,571	-1,067,454	- -
Unobligated balance carried forward ..	1,067,454	- -	- -
Total pay act costs (P. L. 94)	[500]	[- -]	[- -]
Appropriation or estimate	- -	- -	- -

STATUS OF PROGRAM

The Urgent Deficiency Appropriation Act, 1952, provided 10,000,000 for the establishment of facilities for research on foot-and-mouth and other animal diseases. This was in addition to the unobligated balance of \$456,823 available from the Second Deficiency Appropriation Act, 1949, which provided 500,000 for plans and specifications for such facilities.

A contract for \$7,712,000 for construction of the main research facilities was awarded in June 1954. Additional contracts have been made for power lines and other facilities. The Corps of Engineers is supervising construction.

It is anticipated that the laboratory and other facilities will be completed about March 1956.

(f) Working Capital Fund, Agricultural Research Center

This working capital fund is a continuing operating fund established by the 1951 Agricultural Appropriation Act in the amount of \$300,000 to pay the operating costs of certain centralized services and facilities at the Agricultural Research Center pending receipt of reimbursements for such costs from the agencies provided with the services. The integrity of the original appropriation is maintained from year to year by means of these reimbursements.

Statements reflecting the assets and liabilities and income and expenses of the working capital fund as of June 30, 1955, as well as estimates for 1956 and 1957, are printed in the Budget schedules and in the Subcommittee Print for the fiscal year 1957.

STATEMENT OF OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS

(Includes only those amounts which, by November 30, 1955, were actually received or programmed for 1956 or 1957. Since work for other agencies is performed on a service basis, at the request of those agencies and for their benefit, it is not practicable to estimate in advance the amounts to be received in most cases.)

Item	Obligations, 1955	Estimated Obligations, 1956	Estimated Obligations, 1957
Allotments from:			
Flood Prevention, Soil Conservation			
Service-General basin investigations	\$23,689	- -	- -
Allocations and Working Funds			
(Advances from other Agencies):			
Department of Agriculture:			
Soil Conservation Service -			
Watershed protection	a/ 40,438	\$136,800	\$171,800
Agricultural Marketing Service:			
Marketing research and service:			
To develop methods for estimating			
carcass composition of live meat			
animals	14,488	15,710	15,710
To determine the nutritional			
effect of drying unripe grains			
by different procedures on de-			
creases in nutritional value of			
the nutrients	4,037	4,350	4,350
To develop methods and equipment			
for determining the quality of			
shell eggs	3,819	4,100	4,100
For identification and certifica-			
tion of superior meat-type hogs .	20,779	23,330	23,330
For studies on pre-slaughter			
treatment of meat animals	9,073	9,490	9,490
For study of the yield of dairy			
products from a unit quantity			
of milk	4,136	8,930	8,930
To make practical tests for deter-			
mining the baking quality of			
milk solids	9,585	20,900	20,900
For improvement of U. S. Grades			
of hay to increase nutrition			
value	10,769	11,370	11,370
Total, Marketing research and			
service	76,686	98,180	98,180
School lunch program:			
To determine nutritional require-			
ments of school feeding programs	30,813	32,200	32,200
Total, Agricultural Marketing			
Service	107,499	130,380	130,380

(Continued on next page)

Item	: Obligations, : 1955	: Estimated : Obligations, : 1956	: Estimated : Obligations, : 1957
<u>Commodity Credit Corporation</u> - For	:	:	:
research on farm storage of grains	:	:	:
and related commodities	44,841:	- -	- -
Total, allocations and working	:	:	:
funds, Department of Agriculture	192,778:	267,180:	302,180
<u>Atomic Energy Commission</u> - Research	:	:	:
on accumulation and movement of	:	:	:
fission products in soils and plants	69,483:	80,000:	80,000
<u>International Cooperation Adminis-</u>	:	:	:
<u>tration</u> - For expenses in connection	:	:	:
with training, consultation and	:	:	:
technical assistance activities	709,854:	713,775:	- -
<u>Department of the Army:</u>	:	:	:
Chemical, biological and engineering	:	:	:
investigations.....	534,584:	545,909:	- -
Studies on sweet potatoes covering	:	:	:
dehydration, handling and related	:	:	:
research	8,819:	- -	- -
Study of dehydration of fruits and	:	:	:
vegetables	10,441:	- -	- -
For meat inspection and grading	:	:	:
services	466,286:	170,000:	- -
Total, Department of Army	1,020,130:	715,909:	- -
<u>Department of the Air Force</u> - For	:	:	:
experimental investigations, studies	:	:	:
and tests in connection with the	:	:	:
development of special scientific	:	:	:
equipment	38,167:	30,561:	- -
<u>Department of the Interior:</u>	:	:	:
For chemical and physical analysis	:	:	:
of soils and their relation to	:	:	:
irrigation agriculture	1,800:	538:	- -
For research on cotton and other	:	:	:
crops	5,856:	8,910:	- -
Total, Department of the Interior	7,656:	9,448:	- -
<u>General Services Administration</u> -	:	:	:
For research and survey activities	:	:	:
relating to continuing and expand-	:	:	:
ing abaca production in the Western	:	:	:
Hemisphere and the production of	:	:	:
seed	59,773:	66,600:	66,500
<u>Department of State</u> - For quarantine	:	:	:
services in connection with pre-	:	:	:
venting introduction of Oriental	:	:	:
fruitfly into Australia and New	:	:	:
Zealand and purchase of guayule	:	:	:
seeds for the Empresa Nacional	:	:	:
Calvo Solelo, Madrid, Spain	13,383:	5,264:	- -

(Continued on next page)

Items	: Obligations, 1955	: Estimated Obligations, 1956	: Estimated Obligations, 1957
<u>Federal Civil Defense Administration</u>			
Planning and development of programs for protection of livestock and crops under defense emergency conditions	- -	- -	115,000
Total, Allocations and Working Funds	2,111,224:	1,888,737:	563,680
<u>Trust Funds:</u>			
Expenses, feed and attendants for animals in quarantine	20,074:	19,000:	19,000
Inspection of animal foods	77,090:	- -	- -
Expenses and refunds, inspection and grading of farm products:			
1. Inspection and certification of animal foods and inedible agricultural products in interstate and foreign commerce	- -	82,000:	82,000
2. Identification service for meat and other products	- -	15,000:	15,000
3. Contract specification work on meat and meat food products ...	- -	130,000:	130,000
Miscellaneous contributed funds	189,827:	170,000:	139,300
Total, Trust Funds	286,991:	416,000:	385,300
<u>Transfer from Commodity Credit Corporation:</u>			
For accelerated brucellosis eradication program in accordance with the Act of August 28, 1954 (Public Law 690)	11,558,697:	15,000,000:	- -
<u>Obligations Under Reimbursements</u>			
<u>From Governmental and Other Sources:</u>			
Salaries and expenses:			
Research	299,331:	305,420:	302,220
Plant and animal disease and pest control	476,090:	571,362:	571,362
Meat inspection	4,197,673:	5,237,200:	5,237,200
Miscellaneous services to other accounts	429,003:	495,373:	623,823
Total, Salaries and expenses	5,402,097:	6,609,355:	6,734,605
All other	595:	- -	- -
Total, obligations under reimbursements	5,402,692:	6,609,355:	6,734,605
<u>TOTAL, OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS</u>	<u>19,383,293:</u>	<u>23,914,092:</u>	<u>7,683,585</u>

a/ \$20,000 received in 1955 by allotment. This amount shown under allocations and working funds for comparability purposes.

PASSENGER MOTOR VEHICLES

The 1957 Budget Estimates propose the replacement of 319 passenger motor vehicles.

All passenger vehicles to be replaced will either have mileage of more than 60,000, or be 6 or more years old, and nearly all will meet both of these standards. Exceptions to meeting both standards would be due to unusually heavy usage and excessively high operating and maintenance costs. A detailed justification of the proposed replacements follows:

Research

Replacement would be made of 88 of the 407 passenger motor vehicles operated at field stations engaged in research. These vehicles are used in travel where no public transportation is available, such as to farms, ranches, cooperating experiment stations, commercial firms, etc., and in travel to remote sections of large stations. They are essential for collecting experimental data and specimens and for observing research generally.

Plant and Animal Disease and Pest Control

Replacement would be made of 218 of the 825 passenger motor vehicles operated principally in daily farm-to-farm travel in the control and eradication of tuberculosis, brucellosis, sheep scabies, cattle tick fever and hog cholera. Some are operated in travel on plant disease and pest control work and a few on animal and plant quarantine work. The rough and rugged roads over which much of daily farm travel is performed, in all kinds of weather, is very hard on cars. In order to keep them in safe and dependable operating condition, maintenance costs are high at best. Although costs are already excessive on many of them, there is no alternative but to continue using them because the testing and inspection cannot be carried on without them. In most cases, employees who own cars are reluctant to use them for even limited periods because of the hard usage to which they are subjected in this work. The replacements recommended will make it possible for those cars to be replaced which are reaching the inoperable stage.

Meat Inspection

Replacement would be made of 10 of the 53 passenger motor vehicles used on meat inspection work. They are used in 47 States by inspectors in charge, supervisors, and inspectors in visiting meat packing plants under Federal inspection located in metropolitan and rural areas throughout the country. For the most part plants are located where public transportation is infrequent or not available. The use of automobiles enables inspectors to cover inspection needs more efficiently and also saves personnel. For example, where one man with a car can cover two establishments 40 miles apart, without a car it would be necessary to have a man in each plant.

Foot-and-Mouth and Other Contagious Diseases of Animals and Poultry

It is proposed to purchase two busses for use on Plum Island, New York to transport employees from the dock area to the Animal Disease Laboratory. Such transportation is essential to save valuable working time of the approximately 400 employees who will be working on the island. The 3 busses now available are inadequate. No public transportation is available and private vehicles are not allowed on the island. There will be no increase in the total inventory since two passenger motor vehicles of Agricultural Research Service will be exchanged.

Working Capital Fund, Agricultural Research Center

Replacement is proposed of 1 of the 6 passenger motor vehicles used at the Agricultural Research Center. These vehicles are used for transportation in supervising and inspecting the maintenance and operation of the Agricultural Research Center and for transporting officials and visiting agricultural leaders to and from various sections of the Center.

The widely diversified research and regulatory activities and the varying nature of the areas in which cars are operated make it impractical to establish standards for car utilization on a mileage basis or on the basis of number of employees. Cars are a "working tool" to carry workers to the site of testing, inspection or observation work. Under meat inspection, one car is required for each inspector required to service two or more inspected meat packing establishments.

Age and mileage data for passenger-carrying vehicles on hand as of June 30, 1955:

<u>Age-Year</u> <u>Model</u>	<u>Age Data</u>		<u>Lifetime</u> <u>Mileage</u> (thousands)	<u>Mileage Data</u>	
	<u>Number of</u> <u>Vehicles</u>	<u>Percent</u> <u>of Total</u>		<u>Number of</u> <u>Vehicles</u>	<u>Percent</u> <u>of Total</u>
1955	252	19			
1954	41	3			
1953	234	18	Over 100	129	10
1952	105	8	80-100	128	10
1951	124	9	60-80	169	13
1950	118	9	40-60	285	21
1949	215	16	20-40	284	21
1948 or older	243	18	Under 20	337	25
Totals	<u>1,332 a/</u>	<u>100</u>		<u>1,332 a/</u>	<u>100</u>

a/ Excludes 17 vehicles used in foreign countries.

AIRCRAFT

Additions

The Agricultural Research Service requests authority to purchase one additional aircraft for use by its Agricultural Engineering Research Branch in research on the development of improved equipment for aerial application of

Agricultural chemicals to control weeds, insect pests, and plant diseases. Reliable equipment which will provide adequate coverage of crops and fields is needed for farms, ranches, etc. The additional plane would be used for research in Oregon where the only equipment now available is an obsolete type of plane used primarily for controlling truck crop and garden insects and therefore seldom available during the crop season for engineering research studies. Development of application equipment is being delayed by lack of full-time use of a modern plane.

Replacements

Replacement would be made of two aircraft which are used for developing technical procedures for aerial contract specifications and control operations on plant pest control activities. These planes are obsolete and should be replaced by new planes, which would be safer to operate and would be similar to those used by industry.

The type of work required of aircraft used in Plant Pest Control operations has changed radically during the past two years. Primary functions have changed from the actual application of control materials to the supervision of aerial application done under contract and the experimental application of new insecticides for treatments required in conjunction with the regulatory aspects of control programs. The contract work normally involves the annual expenditures of several hundred thousand dollars. Contract operators frequently lack experience in the specialized work required of them and deficiencies in satisfactory supervision can result in the wastage of large quantities of insecticide or the inadequate treatment of infested areas, resulting in serious crop losses.

Most federal-state cooperative control work is done now with aircraft operating at a speed of approximately 150 miles per hour. This requires that aircraft used in supervising their operation travel at approximately the same speed and be able to perform safely over rough terrain at high elevations. The experimental application of new insecticides, particularly those of granular consistency, require the use of an airplane that can apply them uniformly, effectively and safely.

It is proposed that one Cessna 170B be traded in on the purchase of a Cessna 180 or another airplane of similar performance. The Cessna 170B has become outmoded for the type of work required. It is also proposed to replace a Stearman airplane. This plane was a war surplus type that was adapted to agricultural use. It is proposed to trade this in on the purchase of one of the new agricultural airplanes designed especially for pest control work. Such a plane would be much more economical to operate and representative of good pest control equipment. The two aircraft to replace those now in use would have a much greater margin of safety.



EXTENSION SERVICE

Purpose Statement

The function of the nationwide system of cooperative Federal-State extension work in agriculture and home economics, authorized and conducted under the Smith-Lever Act as amended, is to take research results, technological advancements, and situation and program facts of the Department of Agriculture and the State Agricultural Colleges and Experiment Stations, and combine them into an adequate educational program which will provide the means by which people can effectively solve their farm and home problems.

The purpose of the Cooperative Extension Service is to assist the people of the United States by providing them with useful and practical information on subjects relating to agriculture and home economics, and to encourage the application of such information through the giving of instructions and practical demonstrations and other appropriate means.

Among the major end objectives of this work are to:

1. Improve farm efficiency and farm incomes.
2. Develop, improve and conserve agricultural resources.
3. Adjust agricultural production more in line with effective market demands.
4. Expand markets for agricultural products.
5. Reduce marketing costs.
6. Improve home and community living conditions.
7. Develop an informed and competent rural youth.

To accomplish these and other objectives the activities of the entire cooperative extension organization are directed largely toward:

- a. Insuring the economic stability of farm families by increasing their net income through the application of science and technology resulting from research in agriculture and home economics and related subjects. This is accomplished through teaching the application of science and technology in reducing costs, increasing efficiency, improving quality and reducing losses in farm production, improving home operations, developing and conserving soil, water and human resources, and improving marketing methods.
- b. Increasing the efficiency of market operations by encouraging the application of research by handlers, processors, wholesalers, retailers and those engaged in transportation and storage of

agricultural products. This reduces wastes, lowers costs of marketing, expands market outlets and improves the quality of products for consumers.

- c. Improving family living through promoting the adoption of better nutrition and health measures, improving housing and farm home facilities, wider use of labor-saving equipment and methods, the adoption of farm and home safety measures, and the development and use of community health and recreational facilities.
- d. Assisting youth to understand the application of science to farming, homemaking and marketing through 4-H Club work and training youth to accept their full responsibility as citizens.

The cooperative extension service is financed from Federal, State, county and local sources. These funds are used within the States for the employment of county agents, home demonstration agents, 4-H Club agents, State specialists and others who conduct among rural people the joint educational programs adapted to local problems and conditions.

The Federal Extension Service, the educational arm of the United States Department of Agriculture, is responsible for administration, coordination and program leadership for the cooperative extension program in the 51 State and Territorial Extension Services including county extension offices in more than 3,000 counties. The Federal Extension Service, as a partner in the cooperative extension effort, is responsible for administering the provisions of Federal laws authorizing extension work; helping to maintain a modern, efficient and dynamic extension system in each State and Territory; coordinating the work among the States in cooperation with committees of State Directors and through other means; pioneering in new educational methods; evaluating the results of work performed; maintaining liaison with research, service, adjustment, and regulatory agencies of the Department; coordinating all educational work of the Department; and cooperating with other departments of government and private organizations in matters relating to extension education.

On November 30, 1955 there were approximately 14,000 State and county extension workers attached to the State organizations, and 242 Federal employees, 231 of whom were in Washington.

	<u>Estimated Available, 1956</u>	<u>Budget Estimates, 1957</u>
Appropriated funds:		
Payments to States, Hawaii, Alaska, and Puerto Rico	\$45,475,000	\$50,115,000
Salaries and Expenses, Federal Extension Service:		
Administration and coordination	2,030,000	2,065,000
Penalty Mail	1,650,000	1,650,000
Total appropriated funds	<u>49,155,000</u>	<u>53,830,000</u>

Summary of Appropriations, 1956 and Estimates, 1957

Item	: Estimated : available, : 1956	: Budget : estimates, : 1957	: Increase (+) : or : Decrease (-)
Payments to States, Hawaii, Alaska, and Puerto Rico	: \$45,475,000:	: \$50,115,000:	: +\$4,640,000
Federal Extension Service:	:	:	:
Salaries and expenses:	:	:	:
Administration and coordina-	:	:	:
tion	: 2,030,000:	: 2,065,000:	: +35,000
Penalty mail	: 1,650,000:	: 1,650,000:	: - -
Total	: 3,680,000:	: 3,715,000:	: +35,000
Total, direct annual appro-	:	:	:
priations	: 49,155,000:	: 53,830,000:	: +4,675,000

(a) Payments to States, Hawaii, Alaska, and Puerto Rico

Appropriation Act, 1956	\$45,475,000
Budget Estimate, 1957	50,115,000
Increase	<u>+4,640,000</u>

SUMMARY OF INCREASES, 1957

To provide for additional State and county extension workers to carry out the expanding extension program	+3,575,000
To provide for intensive educational work in low income areas under the Rural Development Program, pursuant to Public Law 360, 84th Congress	+890,000
To provide for educational work in marketing to meet urgent current problems	+175,000

PROJECT STATEMENT

Project	1955	1956 (estimated)	Increases	1957 (estimated)
1. Payments for co- operative agricul- tural extension work under Smith- Lever Act	\$38,443,801	\$44,155,000	+\$4,465,000 (1)	\$48,620,000
2. Payments for co- operation in farm forestry extension: work under the Clark-McNary Act (included in Proj- ect 1 in 1956 and 1957)	88,000	- -	- -	- -
3. Payments and contracts under the Agricultural Marketing Act ...	924,548	1,320,000	+175,000 (2)	1,495,000
Unobligated balance	18,651	- -	- -	- -
Total available or estimate	39,475,000	45,475,000	+4,640,000	50,115,000
Transferred to "Salaries and Ex- penses, Farmers' Home Administra- tion"	+200,000	- -		
Total appropriation or estimate	39,675,000	45,475,000		

INCREASES

The increase of \$4,640,000 under this appropriation for 1957 consists of the following:

(1) An increase of \$4,465,000 under the activity "Payments for cooperative agricultural extension work under Smith-Lever Act", composed of:

(a) Increase of \$3,575,000 for additional State and county extension workers to carry out the expanding extension program.

Problem and Need for Increase:

Farmers and Agricultural Marketing Agencies Constantly Face New Problems: Farmer producers and agricultural marketing agencies must step up the efficiency level of their operations in order to remain solvent and at the same time provide food and fiber for the nation's consumers in adequate amounts and at reasonable prices. Risks in farming today are high. The large capital outlay required in today's agriculture together with higher operating costs has greatly increased the risk of loss in farming and leaves little margin for errors in management. In 1947 farm operators' production expenses amounted to 17.2 billion dollars and his realized net income from agriculture amounted to 16.8 billion dollars. In 1954 these expenses had increased to 21.9 billion dollars while net incomes had declined to 12.0 billion dollars. Stated in other terms, during this period farmers' production expenses increased 27 percent while their realized net incomes from agriculture decreased 28 percent. This reflects the seriousness of the cost-price squeeze facing farmers. Farm people today face a rapidly changing technology, rising costs, declining prices, reduced foreign markets, and shifts in demand for raw materials for industrial use. Short-term and mortgage debts are rising. Capital requirements have jumped greatly. Further, the trend toward mechanization, the apparent inflexibility of marketing and distribution costs, the necessity for maintaining the productive capacity of the land--these are additional challenges to a sound agriculture.

Adjustments in production are necessary to make the best use of land and other resources consistent with present effective market demand. Acreage allotments and marketing quotas require careful planning on the part of producers in the use of their resources in order to maintain profitable production.

Consumer demand and food quality regulations are also bringing new problems to farmers and to businesses engaged in the marketing and distribution of food. The matter of keeping food grains clean is an example. Old methods of handling grains for food are no longer adequate. Use of insecticides in fruit and vegetables production and marketing require greater care on the part of producers and handlers if losses are to be avoided. Consumers demand and are willing to pay for less fat on pork cuts. Producing and marketing pork with less fat is a major undertaking and involves many producers and marketing agencies. Producers and marketing agencies must be kept apprised of new and changing situations and their significance if they are to act intelligently.

Extension Must Speed the Application of Research: The lag in time of 10-20 years between the availability of research results and their widespread application is evidence that efficiency in agricultural production and marketing of farm products is not keeping pace. The application of this research is slow because many farm families have difficulty in translating it to their operations. To be most effective the applicability of the findings of research to the many problems and needed adjustments on individual farms and in individual homes must be considered in relation to both as a unit.

Demands for Extension Assistance Exceed Resources: Getting new facts and research results utilized in the organization and operation of the farm and in the home is a basic job of the Extension Service. The ever expanding numbers seeking the advice and help of county extension workers; the increasing complexities of modern farming and homemaking; the variations and scope of the action programs about which all farmers need to be informed; and the coordination and organization work in each county, requiring county Extension agent leadership, have so increased the demands on their time that educational needs and requested individual educational assistance often cannot be met. This is especially true in the counties in which there are only one or two agents.

County extension workers are expected to help inform farmers of changes in farm programs such as acreage allotments, marketing quotas, changes from year to year in the Agricultural Conservation Program practices and requirements, and the services available through Soil Conservation Service and Farmers Home Administration. County agents are requested to provide assistance in organizing committees to develop a rural telephone service or to aid in such activities as a grasshopper control program, a new marketing agreement, or an intensified brucellosis control program. Because of these many and varied responsibilities which have gradually been added, Extension agents cannot adequately meet the direct educational objectives which are the responsibility of the Cooperative Extension Service.

Impersonal Approach Not Enough: The most effective work Extension has done has been that accomplished through assistance to individual farm families on their own farms. The limited number of personnel has restricted this largely to a demonstration basis. Inadequacies of the present Extension Service are centered mostly about the fact that in order to provide some assistance to all farmers, it must still depend largely on educational techniques and informational media that are of an impersonal and generalized nature. These mass approaches have accomplished much and no suggestion for abandoning such approaches is intended in the development of a more adequate program. But in confining extension primarily to mass educational approaches, the whole system tends to serve best those farmers who are both predisposed to change, and are more competent to make application of technological innovations to their own situations. If extension is to be

of maximum help to the farm families in surveying all of the available information, using those findings which pertain to their situations and integrating them into day-to-day and long-range operations of farms and farm homes, individual counseling is required. This cannot be accomplished with the present limited staff.

4-H Club Work Should Reach More Rural Youth: Extension work with 4-H Clubs in training a competent, healthy, and clear thinking rural youth is an influential and extremely vital part of the Extension program. Sound and steady development of 4-H Club work should be actively encouraged as a great asset in the future progress of American life. Achievements through 4-H Club programs are impressive, but work in teaching youth the application of scientific information to farm and home operations, as well as in character development and citizenship training, needs to be extended to thousands of boys and girls not now participating in 4-H Club programs.

The 4-H program has gradually grown to over 2,100,000 participants annually, but it is still far from the goal of reaching the estimated 10,000,000 rural youth that should be reached. Many of these are not now being reached because of a lack of professional staff to provide the educational leadership.

Research Results Advance Family Living: The success of the farm family is closely associated with the degree of application of research results to the operation and management of the home. Rapid advances in research results in fields of nutrition, health measures, housing, labor saving equipment and methods require that families be apprised of such advances in a meaningful way. They request information from Extension agents on adequate diets which make use of home grown foods, new items of equipment, home remodeling or construction and many other matters having a direct bearing on the welfare of the family. The present staff of home agents is inadequate to meet the urgent demands by farm families for assistance.

Increased Financial Support, Federal, State, and Local, Needed: State and local governments are continuing to increase their support of Extension work. There was an increase from these sources of almost three and one half million dollars in 1956. This is further evidence that the cooperative program of the Extension Service is meeting a strongly felt need. Experience has demonstrated that the self-help educational approach used by the Cooperative Extension Service can produce dramatic accomplishments in aiding farmers to solve their own problems. It is the American way for people to make their own decisions. But they need and expect the best available information adapted to their individual needs if they are to make the right decisions.

Plan of Work: Additional manpower is essential to get research results quickly to more farmers and homemakers, and in use. Through direct contacts, this increased advisory staff would bring to more of these farm people in usable form the technical,

economic, and farm program information needed to solve their individual farm and home problems and develop sound, long-range management programs. Additional farm families will be provided with the assistance they are requesting to enable them to make changes in the organization of their farm businesses, to apply sound management practices and research results to the operations of their farms and to family living. Additional educational assistance will be given in marketing. More leadership and training will be provided for 4-H Club work. Even with the increase in funds made available in 1956, the average county agricultural agent is attempting to serve nearly 1,000 farm families, a number much too large for maximum efficiency and effectiveness.

The additional funds requested will be used largely for assistant agents, with such additional supervision, training, and technical guidance as necessary to make the program most effective.

(b) Increase of \$890,000 for educational work in low-income areas under the Rural Development Program, pursuant to Public Law 360, 84th Congress, 1st Session.

Problem and Need for Increase:

The Problem: Farm families with low earnings make up more than a fourth of all farm families. In the United States, in 1949, there were roughly 5.4 million farm operator families in all. About 1.5 million of these had cash incomes under \$1,000. The majority of these farms are concentrated in certain areas in the United States. These agricultural areas are at a disadvantage with respect to agricultural development because of special circumstances affecting such areas. In innumerable cases the problem of the low-income farmer is lack of enough productive land, lack of equipment, lack of credit facilities, and often lack of the management information and skill which might open wider opportunities to him.

In 1950 the Census Bureau reported 639,000 part-time farms in the United States, of which 326,000 had cash family incomes from farm and non-farm sources of less than \$2,000. These farms averaged 16.2 acres of harvested crops and \$612 worth of products sold per farm. Additional off-farm work is one means by which these low income families can add to their earnings. Important in this are developments to increase industrialization and other non-farm employment opportunities and economic mobility. Services should be made available to assist low income farmers in evaluating part-time farming, both as a more or less permanent activity and as a transitional step to full-time farm or non-farm work.

Regular extension programs have not and are not effectively serving the great majority of these large groups of under-employed, low-income and part-time farmers. Special methods and techniques are needed to more adequately serve this group. In many cases community wide interest and effort is needed, especially in developing alternate employment opportunities and incentives. Thus a pilot program is proposed to develop a program for the improvement of the opportunities afforded an important segment

of the Nation's human resources which now are contributing far less than their potential ability to the economic progress of the Nation and as a consequence have an unreasonably low standard of living.

The Need for Educational Assistance: The farmers in those areas who expect to continue in full-time farming need more information of a technical nature that is directly applicable to their farms. They need more educational assistance in improving their managerial skills. And they need educational assistance in deciding upon such things as whether to enlarge their farms, to own or hire more equipment, or add more livestock; and how best to finance these things and get them done. This requires intensive educational help in working out their own plans in accordance with their own resources, their own values and their own situations - then to help them carry out their plans. However, the need for work of this type is not limited to those who have the desire, the ability, and the resources to develop successful full-time farm businesses. Non-farm and part-time farming opportunities need to be evaluated when they appear as more promising alternatives.

Plan of Work: The additional funds will be used for the establishment of pilot extension programs in approximately 35 counties where this need exists. In the pilot programs, qualified personnel will be employed to work on specific problems which affect the farm families and communities of the areas involved. In these counties, it is planned that county and community committees will be established with a broad base of participation; materials will be assembled for analysis and for planning cooperative efforts on the part of all agencies concerned; farm and home management specialist teams will work with individual farmers; new methods of working with farm people of limited opportunities will be explored and tested; and community programs and goals will be developed.

The basis for the selection of counties and the allocation of the funds to the States would take into consideration the extent of problems involved, the number of low-income farms, and the programs proposed. Funds will be made available to the States after approval of budgets submitted by the States concerned supported by an appropriate plan of work in the counties selected for development.

The following table reflects the allocation of Federal funds to States on the basis of rural and farm population:

ALLOCATION OF FEDERAL FUNDS TO STATES AND TERRITORIES
ON THE BASIS OF RURAL AND FARM POPULATION a/

STATES	:	1956	:	PROPOSED INCREASE	:	TOTAL PROPOSED FOR
	:		:	1957	:	1957
Alabama	\$	1,613,340	\$	117,200	\$	1,730,540
Arizona		217,752		15,330		233,082
Arkansas		1,322,285		92,987		1,415,272
California		1,088,186		103,199		1,191,385
Colorado		407,780		28,351		436,131
Connecticut		230,232		18,107		248,339
Delaware		115,273		5,922		121,195
Florida		517,036		44,790		561,826
Georgia		1,685,872		122,168		1,808,040
Idaho		308,558		21,440		329,998
Illinois		1,347,494		110,949		1,458,443
Indiana		1,119,624		92,771		1,212,395
Iowa		1,222,036		94,744		1,316,780
Kansas		832,836		57,577		890,413
Kentucky		1,578,143		122,137		1,700,280
Louisiana		1,053,714		75,110		1,128,824
Maine		299,497		22,209		321,706
Maryland		416,141		34,354		450,495
Massachusetts		321,348		28,139		349,487
Michigan		1,223,650		103,709		1,327,359
Minnesota		1,168,758		91,323		1,260,081
Mississippi		1,658,139		121,863		1,780,002
Missouri		1,388,225		104,645		1,492,870
Montana		309,488		19,222		328,710
Nebraska		699,084		47,756		746,840
Nevada		90,132		2,980		93,112
New Hampshire		159,511		10,364		169,875
New Jersey		317,510		27,594		345,104
New Mexico		279,600		19,247		298,847
New York		1,145,602		104,408		1,250,010
North Carolina		2,130,707		174,490		2,305,197
North Dakota		480,701		30,935		511,636
Ohio		1,521,171		129,992		1,651,163
Oklahoma		1,135,348		70,479		1,205,827
Oregon		432,185		36,723		468,908
Pennsylvania		1,493,659		141,217		1,634,876
Rhode Island		89,593		4,548		94,141
South Carolina		1,158,918		87,918		1,246,836
South Dakota		482,756		30,322		513,078
Tennessee		1,595,385		124,466		1,719,851
Texas		2,599,713		174,597		2,774,310
Utah		208,828		13,292		222,120
Vermont		200,255		12,757		213,012
Virginia		1,296,191		102,601		1,398,792
Washington		537,782		45,231		583,013
West Virginia		795,817		67,293		863,110
Wisconsin		1,160,334		93,099		1,253,433
Wyoming		165,362		8,243		173,605
Alaska		70,307		2,938		73,245
Hawaii		219,552		12,185		231,737
Puerto Rico		1,249,281		212,079		1,461,360
Total		43,160,691		3,436,000		46,596,691

a/ Excludes (1) funds for special needs under Section 3(b) and 3(c) 1, Public Law 83, 83rd Congress (2) funds for special needs in low-income areas under the Rural Development Program (Section 8, Public Law 360, 84th Congress) and (3) funds for payments and contracts under the Agricultural Marketing Act.



(2) An increase of \$175,000 to expand marketing educational work on a matching fund basis and under contracts.

Problem and Need for Increase:

Increasing Marketing Efficiency: Further emphasis needs to be placed on helping marketing agencies adopt research findings which show ways of reducing costs of operations and of maintaining quality. For example, groups of farmers and dealers at the country point need assistance in analyzing their needs for local assembly markets and facilities. Extensive research has already been conducted with the many important segments of the trade from country assembly markets to retail stores. Many marketing studies have been made and recommendations for improvement developed but relatively few actual changes have been made in many cases. Particular emphasis needs to be placed on developing a widespread understanding and adoption of the results of this research.

Helping Processors Adopt Latest Utilization Research Findings to Expand the Outlets for Farm Products: New utilization developments which provide an opportunity for expanding farm outlets, increasing returns to farmers, cutting cost for the processor, or making a product more useful to consumers or industry are constantly being provided by research. Thus, a new use for surplus inedible animal fats in making steel, a new method of dehydrating tomatoes to powder form, and making plastics from dairy plant wastes are but a few examples of new developments that need to be carried back for application by processors. A few State extension services are now doing work in this area and more emphasis needs to be placed on this work.

Research and Agricultural Marketing Advisory Committees Recommend More Educational Work with Marketing Agencies and Consumers: RMA advisory committees have recommended during this past year that educational work with consumers, processors, wholesalers and retailers be expanded to additional States and intensified in States where such work is now carried on. These recommendations were made with the realization that more wide-spread adoption of research findings by these groups would result in increased returns to farmers and lower marketing costs which would benefit other segments of our society as well.

Plan of Work: With additional funds, it will be possible to provide more on-the-spot assistance with area or district marketing agencies. This proposed increase in work is distinguished from that under the Smith-Lever Act by the need to provide funds for specific projects in a particular area or State which cannot be financed from the more general distribution of funds under the formula set forth in the Smith-Lever Act. The proposed increase of \$175,000 for fiscal year 1957 would permit State extension services to further expand marketing work on a matching fund basis with trade groups and consumers and provide for limited expansion of regional marketing information programs. Of this total not less than \$15,000 would be used for contracts.

CHANGES IN LANGUAGE

The estimates include proposed changes in the language of this item as follows (new language underscored; deleted matter enclosed in brackets):

- For payments for cooperative agricultural extension work under the Smith-Lever Act, as amended by the Act of June 26, 1953
- 1 ([Public Law 83), \$44,155,000] 7 U.S.C. 341-348) and the Act of August 11, 1955 (69 Stat. 683-4), \$48,620,000; and payments and contracts for such work under section 204(b)-205 of the Agricultural Marketing Act of 1946 (7 U.S.C. 1623-1624), [\$1,320,000] \$1,495,000; in all, [\$45,475,000] \$50,115,000:
Provided, That funds hereby appropriated pursuant to section
 - 2 3 (c) of the Act of June 26, 1953 [(Public Law 83)] shall not be paid to any State, Hawaii, Alaska, or Puerto Rico prior to availability of an equal sum from non-Federal sources for expenditure during the current fiscal year.

The first change in language proposes to insert the U. S. Code Citation for the Smith-Lever Act as amended by the Act of June 26, 1953, and reference to the amendment of August 11, 1955 (Public Law 360) which provides for additional extension work in certain agricultural areas which are at a disadvantage because of special circumstances.

The second change in language deletes the Public Law reference to the Act of June 26, 1953 since the U. S. Code reference thereto appears above in the language.

PAYMENTS TO STATES AND TERRITORIES

Federal funds available for fiscal year 1956 for cooperative agricultural extension work within the States, Hawaii, Alaska, and Puerto Rico under the Smith-Lever Act, as amended (\$44,155,000), and for carrying out the provisions of the Agricultural Marketing Act (\$1,195,000 for payments to States and \$125,000 for contracts) total \$45,475,000.

Payments to the States and Territories are made directly to a designated officer in each State and Territory and the funds are disbursed by them in accordance with budgets and programs of work submitted by the State directors of extension and approved by the Administrator of the Federal Extension Service on behalf of the Secretary of Agriculture. As reflected on Table 1, at present less than 42 percent of the cost of extension work is being financed from Federal sources and more than 58 percent from State and local sources. The funds are used by the States for the employment of extension workers to carry on cooperative agricultural extension work. Paid extension workers are being assisted by a network of voluntary neighborhood leaders who cooperate in carrying out extension programs.

The use of these funds is indicated in greater detail in the following tables. Table 1 indicates the sources of funds allotted for cooperative extension work in the States, Alaska, Hawaii, and Puerto Rico for 1956, including allotments under the Agriculture Marketing Act. Table 2 shows estimated direct payments to and contracts with States and Territories for 1957, indicating those which require offset by States, county or local funds, those where such offset is not required, and the basis of allotment. Table 3 indicates the various classes of field agents employed with extension funds.

U. S. DEPARTMENT OF AGRICULTURE

FEDERAL EXTENSION SERVICE

Table 1

SOURCES OF FUNDS ALLOTTED FOR COOPERATIVE EXTENSION WORK IN STATES, ALASKA, HAWAII, AND PUERTO RICO
FOR THE FISCAL YEAR ENDING JUNE 30, 1956

STATES				FUNDS FROM FEDERAL SOURCES		FUNDS FROM WITHIN THE STATES		LOCAL NON-PUBLIC SOURCES
	GRAND TOTAL	TOTAL FEDERAL FUNDS	TOTAL WITHIN THE STATES	SMITH-LEVER ACT AS AMENDED JUNE 26, 1953	AGRICULTURAL MARKETING ACT* (TITLE II)	STATE AND COLLEGE	COUNTY	
Alabama	\$ 3,125,234.68	\$ 1,636,494.84	\$ 1,488,739.84	\$ 1,613,339.84	\$ 23,155.00	\$ 845,739.84	\$ 643,000.00	\$ -
Arizona	550,055.50	237,751.89	312,303.61	237,751.89	-	262,807.41	49,496.20	-
Arkansas	2,176,404.27	1,322,285.27	854,119.00	1,322,285.27	-	507,750.00	340,569.00	5,800.00
California	5,007,604.91	1,115,685.65	3,891,919.26	1,088,185.65	27,500.00	2,719,950.26	1,171,969.00	-
Colorado	1,311,803.00	457,655.27	854,147.73	452,780.27	4,875.00	447,402.73	406,745.00	-
Connecticut	751,921.26	238,647.26	513,274.00	230,232.26	8,415.00	279,434.00	219,305.00	14,535.00
Delaware	264,173.82	127,123.82	137,050.00	116,123.81	11,000.00	125,550.00	2,000.00	9,500.00
Florida	1,840,678.50	524,461.50	1,316,217.00	517,036.50	7,425.00	722,309.00	593,908.00	-
Georgia	3,268,395.05	1,719,070.05	1,549,325.00	1,685,872.05	33,198.00	766,250.00	783,075.00	-
Idaho	1,022,650.69	355,557.86	667,092.83	350,557.86	5,000.00	376,409.83	270,683.00	20,000.00
Illinois	3,811,830.15	1,360,594.15	2,451,236.00	1,347,494.15	13,100.00	1,021,236.00	12,000.00	1,418,000.00
Indiana	2,912,673.26	1,154,001.26	1,758,672.00	1,119,624.26	34,377.00	932,536.00	808,436.00	17,700.00
Iowa	3,012,113.99	1,262,085.99	1,750,028.00	1,222,035.99	40,050.00	959,813.00	706,215.00	84,000.00
Kansas	3,204,441.29	885,249.29	2,319,192.00	852,835.29	32,414.00	599,003.00	1,661,124.00	59,065.00
Kentucky	2,768,193.94	1,601,643.94	1,166,550.00	1,578,143.94	23,500.00	683,350.00	483,200.00	-
Louisiana	3,077,990.06	1,095,382.59	1,982,607.47	1,053,714.59	41,668.00	1,725,975.30	250,312.17	6,320.00
Maine	666,833.28	319,996.11	346,837.11	304,496.11	15,500.00	231,971.17	114,866.00	-
Maryland	1,667,417.38	450,483.99	1,216,933.39	416,140.99	34,343.00	934,012.39	282,921.00	-
Massachusetts	1,334,046.56	346,797.76	987,248.80	321,347.76	25,450.00	380,300.00	606,948.80	-
Michigan	3,857,939.50	1,314,249.86	2,543,689.64	1,223,649.86	90,600.00	1,831,884.00	633,500.00	78,305.00
Minnesota	2,260,862.57	1,167,883.00	1,072,979.57	1,168,758.00	19,125.00	511,006.00	561,973.57	-
Mississippi	3,185,127.00	1,682,755.08	1,502,371.92	1,658,139.08	24,616.00	796,000.00	673,606.92	32,765.00
Missouri	2,912,572.38	1,425,625.43	1,486,946.95	1,388,225.43	37,400.00	825,851.50	482,322.79	178,772.66
Montana	1,086,846.96	385,437.96	701,409.00	377,787.96	7,650.00	327,787.00	373,622.00	-
Nebraska	1,915,299.93	719,983.47	1,195,316.46	705,383.47	14,600.00	745,316.46	450,000.00	-
Nevada	353,562.99	166,231.55	167,331.44	166,231.55	-	103,243.00	84,088.44	-
New Hampshire	532,762.02	168,037.99	364,724.03	159,510.99	8,527.00	230,423.03	134,301.00	-
New Jersey	1,452,424.25	334,687.49	1,117,736.76	317,510.49	17,177.00	616,746.50	497,294.26	3,696.00
New Mexico	919,186.50	357,299.45	561,887.05	336,899.45	20,400.00	428,150.05	133,737.00	-
New York	5,253,274.03	1,180,602.77	4,072,671.26	1,145,602.77	35,000.00	1,718,578.73	2,027,508.13	326,584.40
North Carolina	5,573,712.54	2,161,349.54	3,412,363.00	2,130,706.54	30,643.00	2,083,390.00	1,328,973.00	-
North Dakota	1,085,802.36	531,100.86	554,701.50	517,700.86	13,400.00	188,000.00	366,701.50	-
Ohio	3,044,102.92	1,567,920.48	1,476,182.44	1,521,170.48	46,750.00	803,692.00	645,410.44	27,080.00
Oklahoma	2,511,384.40	1,187,501.40	1,323,883.00	1,135,347.40	52,154.00	974,783.00	343,000.00	6,100.00
Oregon	2,310,263.91	501,014.92	1,809,248.99	470,184.92	30,830.00	1,297,590.45	511,658.54	-
Pennsylvania	3,009,124.64	1,511,458.64	1,497,666.00	1,493,658.64	17,800.00	1,087,666.00	410,000.00	-
Rhode Island	218,227.24	92,755.74	125,471.50	89,593.74	3,162.00	98,571.50	23,025.00	3,875.00
South Carolina	2,228,072.92	1,166,406.12	1,061,666.80	1,158,918.12	7,488.00	915,000.00	140,186.80	6,480.00
South Dakota	1,225,316.28	519,206.28	706,110.00	515,756.28	3,450.00	488,490.00	206,500.00	11,120.00
Tennessee	2,970,111.50	1,619,932.69	1,350,178.61	1,595,385.89	24,547.00	883,607.61	465,341.00	1,230.00
Texas	5,467,489.17	2,609,863.80	2,857,625.37	2,599,712.80	10,151.00	1,022,937.84	1,833,387.53	1,300.00
Utah	708,667.16	282,661.18	426,005.98	268,828.18	13,833.00	300,675.00	125,330.98	-
Vermont	592,227.60	218,405.03	373,822.57	212,255.03	6,150.00	259,493.37	114,329.20	-
Virginia	3,232,766.15	1,306,011.15	1,926,755.00	1,296,191.15	9,820.00	1,511,429.00	415,326.00	-
Washington	1,765,582.48	612,480.14	1,153,102.34	595,982.14	16,498.00	666,959.00	486,143.34	-
West Virginia	1,415,316.30	798,016.42	617,299.88	795,816.42	2,200.00	374,465.00	239,934.88	2,900.00
Wisconsin	2,861,943.11	1,194,634.11	1,667,309.00	1,160,334.11	34,300.00	646,776.00	1,020,533.00	-
Wyoming	670,472.15	224,862.34	445,609.81	220,862.34	4,000.00	297,966.81	147,643.00	-
Alaska	165,640.00	73,306.18	92,333.82	70,306.18	3,000.00	92,333.82	-	-
Hawaii	650,724.39	233,961.78	416,762.61	219,551.78	14,410.00	416,762.61	-	-
Puerto Rico	2,055,678.65	1,283,280.65	772,398.00	1,249,280.65	34,000.00	772,398.00	-	-
Unallotted	360,107.84	360,107.84	-	359,758.84	349.00	-	-	-
Regional Contracts	285,000.00	285,000.00	-	-	285,000.00	-	-	-
GRAND TOTAL	\$109,912,053.42	\$45,475,000.02	\$64,437,053.40	\$44,155,000.02	\$1,320,000.00	\$37,839,773.21	\$24,282,151.49	\$2,315,128.70

* - Preliminary Distribution

Table 2. Statement of direct payments to and contracts with States, Hawaii, Alaska, and Puerto Rico, indicating those requiring offset by States and Territories, those not requiring such offset, and basis of distribution as estimated for 1957.

Item	Total Estimate 1957	Basis of Allotment	Amount paid without offset	Amount requiring offset
1. Payments for co- operative agricul- tural extension work under Smith- Lever Act of May 8, 1914, as amended by the Act of June 26, 1953 (Public Law 83)	\$48,620,000	\$401,090-To Puerto Rico as specified by law. \$13,861,225-On basis of rural population \$31,779,376-On basis of farm population \$1,133,309-On basis of special needs a/ \$890,000-On basis of special needs in low-income areas under the Rural Development Program b/ \$555,000-To adjust inequities resulting from shifts in population c/	\$15,403,808	\$33,216,192
2. Payments and contracts under section 204b-205 of the Agricultural Marketing Act of 1946 (7 U.S.C. 1623-1624)	1,495,000	\$1,495,000-On basis of approved projects and contracts d/	140,000	1,355,000
Total, direct				
Federal payments ...	50,115,000	50,115,000	15,543,808	34,571,192

a/ Of the \$1,133,309 for special needs, \$500,000 is authorized in Section 3(b) of the Smith-Lever Act, as amended, for allotment to the States and the Territory of Hawaii on the basis of special needs due to population characteristics, area in relation to farm population, or other special problems, as determined by the Secretary. Also under Section 3(c)1 of the Smith-Lever Act, as amended, 4% of any amount appropriated pursuant to this section is allotted to the States, Hawaii, Alaska and Puerto Rico on the basis of special needs as determined by the Secretary.

b/ Authorized by Section 8 of the Smith-Lever Act, as amended.

c/ Distributed to the States as determined by the Secretary in accordance with the Act of April 24, 1939, as amended. This distribution was continued by Sec. 3(b) of the Smith-Lever Act, as amended June 26, 1953.

d/ Distribution to States based on annually approved cooperative projects for marketing service and regional marketing contracts.

Table 3. Extension field agents employed June 30, 1952, 1953, 1954 and 1955.

	: June 30, : : 1952 :	June 30, : : 1953 :	June 30, : : 1954 :	June 30, : : 1955 :
State supervisors	788:	787:	797:	813
Administrative	a/ :	a/ :	a/ :	74
Subject-matter specialists	2,206:	2,195:	2,256:	b/1,982
Total with headquarters at colleges ...	2,994:	2,982:	3,053:	2,869
County workers:	:	:	:	:
Agricultural agents	4,866:	4,940:	5,012:	5,675
Home demonstration agents	3,285:	3,290:	3,288:	3,583
Boys' and girls' club agents <u>c/</u> ...	645:	617:	560:	542
Negro extension agents	803:	795:	804:	846
Total county workers	9,599:	9,642:	9,664:	10,646
TOTAL	12,593:	12,624:	12,717:	13,515

Number of agricultural counties in the
States, Hawaii, Alaska, and Puerto Rico 3,156
Number of agricultural counties now
having one or more agents 3,095

a/ Records for 1952, 1953, and 1954 do not show administrative employees under cooperative appointment.

b/ Effective June 30, 1955 records only reflect employees holding cooperative appointment.

c/ These are special 4-H Club workers. In the majority of States, Alaska, Hawaii, and Puerto Rico, 4-H Club work is conducted by county and home demonstration agents and their assistants.

STATUS OF PROGRAM

General: The primary function of Cooperative Extension work in agriculture and home economics is out-of-school education, carried on by the United States Department of Agriculture, in cooperation with the State Land-Grant Colleges and county governments. Jointly employed county agricultural, home demonstration, and 4-H Club agents work with farm people and other groups by making available information on research, economics, farm program facts, and by helping them to apply an ever-widening range of scientific knowledge in agriculture and home economics that is locally applicable. The Extension Service is the educational link between farmers and the total research facilities of the Department of Agriculture and the State agricultural colleges and experiment stations. The basic objective of extension work is to help people increase their managerial and technical skills in farming and homemaking and thereby improve their economic status, family and community life.

Financing: The costs of this cooperative program are shared by Federal, State and county governments. Federal funds in the fiscal year 1956 contribute 41.4 percent; State governments contribute 34.4 percent, and county and local sources provide the other 24.2 percent.

Selected Examples of Recent Progress:

1. Over Four Million Farm Families Assisted: County agents estimate the total number of farm families assisted by Extension work during the calendar year 1954 at approximately 4,150,000. In reaching these large numbers of people on ever-broadening and more complicated technological and economic problems, Extension agents used many methods - meetings, on-farm assistance, demonstrations, publications, radio, television visual aids, letters, and the assistance of local leaders.
2. Farm and Home Unit Approach Expanded: The major educational goal of the Cooperative Extension Service during the past year has been the expansion and redirection of educational methods towards the whole farm or unit approach to the problems of farm families. The purpose of this method of approach in Cooperative Extension educational programs is to provide for the selective application of research findings to the specific problems of individual farms and farm families as a unit. The objective is to help farm families achieve more efficient production, higher net income, develop, improve and conserve agricultural resources, and to attain better family living through practical application of managerial skills and the application of research and economic information to their situation.

This concept of the unit approach is consistent with the traditional function of Extension to help people help themselves - as opposed to the idea of making decisions for them or performing purely service functions.

Accomplishments in developing this method of doing extension education have been nationwide. This method has helped many farm families make

greater use of the results of research in their operations. For example, since its start in four pilot counties in 1948, the program in Kentucky has spread to more than half of the State's 120 counties.

A report from Lafayette County, Missouri, illustrates progress made by families participating in the program in achieving better farming and family living:

"During the past six years, 261 farm families have started participating in the program. These families have built 36 percent of all the terraces constructed in the county during this time. They have built 47 percent of the terrace outlets, have used three times as much fertilizer as the average farmer in the county, and have plowed under two and one-half times as much legumes for green manure as the county average.

"Some 68 percent of the families raise their pigs on clean ground compared to the county average of 11 percent. And they are improving their pastures at six times the rate of the county average.

"Twelve families have built new homes, 40 have completely remodeled their homes, 42 have added bathrooms, 35 have remodeled their kitchens, and 24 have added central heating during this period."

Over the State as a whole, Missouri families participating in the program used an average of 28 tons of fertilizer last year compared to the State average of 4-1/2 tons per farm.

How the program helps farm families make sound decisions is illustrated by the experience of a Utah farm family. Faced with the problem of whether or not to sell their cows and forsake the Grade A market, or whether they should build a new milking parlor, the family turned to county Extension workers for assistance. The following became apparent to the family after the agents helped them make a thorough analysis of their farming operation:

1. Their broiler business could be profitably expanded.
2. Their farm had a potential large capacity for feed and forage production.
3. Their purchase agreement for the farm was about as binding as a 5-year lease as far as ownership was concerned.
4. The family had a herd of good dairy cows and was close to a good market.
5. The family was working at a level detrimental to health.

The agents assisted the family in analyzing their objectives, problems, and resources. Various alternatives were considered, and on the basis of these, the family:

1. Built a new grade A milking parlor where they now milk 40 cows in one-third less time and with less effort than was previously required.
 2. Re-negotiated their purchase contract to make it more favorable than before.
 3. Started producing corn silage, seeded improved pasture, and used commercial fertilizer to greatly boost yields.
 4. Expanded their dairy and poultry units.
 5. Employed a man to help handle the increased units and to reduce the work load.
3. The Clean Grain Program Intensified: Recent programs of the Federal Food and Drug Administration and requirements by the Commodity Stabilization Service that wheat stored under price support loan or purchase agreement must be kept free of contamination by insects, birds, and rodents have created serious problems for producers, handlers, warehousemen, and processors of food grains.

Educational work directed toward reducing losses of stored grains has long been a part of Extension Service programs. In recent years, a more intensive educational movement, designed to reduce losses and contamination of food grains by insects, birds, and rodents, has been developed. This movement has the support and active participation of food grain industry groups, Governmental agencies, farm and commodity organizations, civic groups, transportation companies and others interested in clean grain.

Because of the widespread interest in keeping food grains clean, extension workers spearheaded the effort to establish several State and regional committees or councils to help plan and guide intensive educational programs. The Nebraska State Grain Sanitation Council, for instance, is made up of representatives of the Nebraska Extension Service, the Nebraska Grain Improvement Association, the Nebraska Grain and Food Dealers' Association, the Lincoln and Omaha grain exchanges, the Nebraska Farm Bureau Federation, the Farmers' Educational and Cooperative Union of Nebraska, the State Agricultural Stabilization and Conservation Committee, and the United States Fish and Wildlife Service. The council has helped sponsor a broad and effective educational program in Nebraska. Nearly all important wheat States have a committee or council to help with clean grain educational work.

Training programs for grain buyers, handlers, elevator operators, and processors were held in 19 States last year. Demonstrations which are the backbone of Extension teaching are being used extensively in all phases of the clean grain program. North Dakota, for instance, held 20 farm rat-baiting demonstrations in cooperation with the United States Fish and Wildlife Service last year, and Illinois Extension workers held 25 demonstrations on grain storage, and insect and rodent control in 1954. Grain elevator clean-up demonstrations were attended by 387 Oklahoma elevator operators.

In several States discussions on keeping grain clean are an important part of field demonstrations of improved crop varieties and other production practices. Kansas includes demonstrations on bin spraying and fumigation in its clean grain program. For example, in Kansas 4-H Club members have sponsored intensive county-wide rat-control programs.

4. 4-H Club Work Stressed: When about 44,000 additional boys and girls joined 4-H Clubs in 1954, total membership for the year jumped to an all-time high of 2,104,787. These young people, between 10 and 21 years old, belong to 88,093 community or county 4-H Clubs in all 48 States, Alaska, Hawaii, and Puerto Rico.

At the same time the 4-H'ers were carrying on a total of 4,502,022 individual farm and home projects, they were learning the basic techniques of good farming and homemaking. They were also acquiring wholesome attitudes, good character qualities, and worthwhile habits to pave the way for happy, purposeful living.

A better understanding of marketing and consumer buying is now being stressed in 4-H Club work. An example of the new emphasis "in action" is Oklahoma, where more than 4,000 4-H Club girls took training last year in recognizing meat quality. Naturally this kind of effort - multiplied in other States - will swell the market for better livestock, because tomorrow's homemakers will be wiser buyers.

The tractor and farm machinery program illustrates a fast-growing project among older 4-H Club boys. Since it started in 1945, 31,297 local leaders have been trained for it by the Cooperative Extension Service. These leaders, in turn, have helped 405,358 Club members gain farm machinery skills and safety habits that will stand them in good stead the rest of their lives.

This type of activity is important in teaching young men how to operate heavy farm tractors safely and profitably. The leaders who instruct them are qualified to be project leaders by earlier training in operation, adjustment and maintenance, and in safety methods. The oil and implement industries cooperate with them in the undertaking.

5. Cotton Improvement Program Saves Farmers Substantial Sums Annually: Extension educational programs in cotton have been directed toward cotton improvement, increased yield and reduced costs. Returns to American cotton growers for the lint alone from the 1954 acreage were raised by \$92,405,000 from the 1953 level, and by \$369,619,000 over what they would have been with yields of the preceding 10 years. Longer staples and stronger fiber are important quality factors which are receiving emphasis.

This substantial development is due to a combination of many influences including notably research, processing, marketing, production, adjustment, and conservation programs. The role of the Extension Service is that of

bringing all of these influences to bear at the farm level and in the market channels. This coordination is a job with many facets. To insure attention to all phases, Extension is engaged in a complete program of improvement. Better techniques are being vigorously pushed at no less than eleven stages in cotton production, beginning with the selection of the land and reaching to the marketing of the crop. Included is cotton grade improvement through Extension training schools for cotton gin foremen which is saving farmers \$5 million annually by reducing rough gin preparation to less than 1 percent of the crop under the 4-Point Extension Cotton Ginning program. However, identification by cotton spinners of damage to lint traced to mechanical cotton pickers makes additional educational Extension work urgent.

6. Extension Assists in the Growing and Use of Certified Seed: Once research has developed better crop plants two essential tasks remain before there can be any real benefit. The seed must be greatly multiplied to supply the farmers' requirements and farmers in great numbers must be persuaded to plant this seed in place of their current varieties. The Extension Service, through its familiarity with the needs and interests of the farmer in a practical way, and its close association with the research worker, is familiar with the superior varieties. As a result, once the new variety can be released, Extension workers locate key growers for multiplying the seed and at the same time stimulate the interest of farmers in adopting the new variety.
7. Chemical Weed Control Takes Hold: Using techniques that were unknown 10 years ago, American farmers cut their losses from weeds by more than \$200 million in 1954 by the use of chemical control measures. The loss to the farmer from weeds is enormous. Recent estimates place it at some 4 billion dollars annually. Even a small percentage reduction, therefore, means a great saving in total. Over 10 percent of the cultivated crop acreage was sprayed as were millions of acres of pasture and rangelands. The total ranges between 35 and 40 million acres. Approximately 70 percent of the spraying was done by the farmer himself, indicating the influence of extension training - when, how, and what to spray.
8. Brucellosis Program Accelerated: The Federal-State Extension Services, in cooperation with the Agricultural Research Service and the livestock industry, are vigorously pushing forward the educational program of the accelerated brucellosis eradication campaign inaugurated during September 1954. Extension workers are assisting in the organization of State and county brucellosis committees throughout the nation and are presenting information pertaining to the accelerated program down to the county and farm level.
9. Inquiries on Pest Control Accounted for 17 percent of all inquiries asked of County Agents: The passage of Public Law 518, 83rd Congress, which provides for the Food and Drug Administration to establish tolerances on pesticides has emphasized and expanded the job of Extension workers. About one-half billion pounds of chemicals, many of

which are potent, are used annually in America to provide the food, feed, and fiber in the amounts and the quality necessary to meet domestic and foreign demands. Extension is called upon to keep the public informed on the wise and safe use of pesticides.

Last year 17 percent of all questions asked of county agents related to insect control, and assistance was given 7 million problem cases. Louisiana reported that as a result of insect and rodent control programs, its farmers realized a gross income of approximately \$125,000,000 more than could have been obtained without the program; Illinois reported a saving of about \$2 million to farmers in the State by control of clover leaf weevils, spittle bugs, and pea aphids; another 1-3/4 millions by control of cutworms and armyworms, and another million by control of soil insects. Oregon reported ranchers saved a million dollars by treating 1/2 million head of cattle for control of ticks, lice, grubs, and horn flies.

10. Fruit and Vegetable Marketing Facilities Improved: A number of educational meetings were held with growers, shippers, wholesalers, retailers, city officials and others in the Lynchburg, Virginia area to point out inefficiencies in the existing market and various plans of action that could be taken to correct these defects. As a result of this program, a new wholesale produce market will be built for Lynchburg, which when completed will save consumers in the Lynchburg area thousands of dollars annually. It will also provide an expanded outlet for local growers and handlers as it will enable them to reduce costs and operate more efficiently. This example is multiplied by the many other markets being improved or built over the country resulting from similar education programs.
11. Increased Understanding and Use of Marketing Outlook and Information: The State Extension Services have participated in disseminating marketing and outlook information in order to provide producers and marketers one of the necessary bases for making adjustments in their individual operations. An example of public acceptance of Outlook work is taken from the Extension Service, State College of Washington. It became obvious in 1954 that many States, particularly some of the early producing States, were reducing their potato acreage too sharply as a result of poor prices, nationally, the previous season. Thus, a good price Outlook for Washington potatoes, especially the summer crop, was publicized through their Outlook publication, news articles, farm meetings and radio.

In spite of farmer losses on the 1953 potato crop, Washington farmers increased their 1954 harvested acreage 11 percent - much more than any other State. (There was a national acreage reduction of 7.9.) Washington potato prices for the 1954 crop were satisfactory. The farm value of Washington's potato production was 7.9 million in 1953 and 13.9 million in 1954.

12. Egg Marketing Studied and Improved - Missouri: In many Missouri counties outlets to market eggs on a quality basis are not available to producers. In many of the trade areas, there is need for markets that will pay producers for quality eggs. The Montgomery County quality egg marketing program was developed as a result of the local people indicating that egg marketing was a problem that needed a solution. The county Extension staff took the initiative in working with the people concerned in assisting them in analyzing their problem and arriving at a proper solution. As a result of a series of quality egg meetings, tours and farm visits, one producer began in May 1954 delivering eggs to a buyer who paid a price differential based on quality. By June, 55 producers and 4 handlers were taking part. By September over 100 cases of eggs were being marketed in this manner and by November volume had reached 336 cases per week with 7 handlers and 205 producers participating in the program. Producers received an additional 12-1/4 cents per dozen or a total of \$13,000 more than if they had sold eggs on a current receipts market. It is estimated that the volume of eggs that may be marketed from the county under this program may increase 5 to 6 times and that this increase in volume will be accompanied by a corresponding increase in returns to farmer producers.

13. Poultry Marketing More Effective - Delaware: Since the inauguration of an educational program in 1950, with broiler producers and processors there has been a noticeable increase in both the quality and marketing efficiency.

A study to determine the causes of bruises in poultry and methods of reducing them showed that between 7 and 17 percent of all poultry was bruised seriously enough to cause loss. Based on the results of this study, the Extension Service inaugurated an intensive educational program with broiler producers and processors. It was demonstrated that when producers and processors assumed mutual responsibility for reducing this great economic waste, results were outstanding. Many plants now report that they have reduced their losses caused by bruises by at least 50 percent. There has also been a noticeable improvement in quality as a result of the application of improved processing methods, better plant grading and more accurate sizing. Processing costs have been reduced and the margin between live and processed poultry reduced by approximately one cent per pound. On a ready-to-cook weight basis, Delaware producers marketed in 1954, more than 160 million pounds of broilers resulting in a reduction in marketing costs of 1.6 million dollars.

14. Nutrition Information Aided Homemakers in Preparing Meals: As a result of studies which show the lack of essential food elements in the eating habits of various groups, Extension home economists are focusing more attention on the importance of selecting food which provides the needed nutrients, on improving the home food supply and on better meal planning. Throughout the country more than 1-1/2 million families were helped with preservation and storage of food during 1954. In South Carolina, experiment station research showed that two-thirds of the

people in the State failed to get the recommended daily allowance of vitamin C, and only one-half the diets furnished adequate amounts of vitamin A in the late winter and early spring. To counteract this, a demonstration - Better Use of the Home Food Supply - fresh, canned, stored, and frozen - was used to point up the seasonal lack of fresh vegetables and fruits during tobacco picking season and to encourage home production and preservation of fruits and vegetables so that the family could have them at this season.

15. Irrigation Program in Humid Areas Required Increased Attention: Increasing interest of farmers in irrigation in humid areas of the country has required an active Extension program in the wide area affected by drought in the Eastern, Southern and Great Plains States and the Ohio Valley. This was in addition to the regular work in the more arid irrigated areas of the West. Altogether, nearly 165,000 farmers in 2,531 counties received Extension assistance in obtaining water supplies, storage and irrigation distribution systems on their farms, and 126,643 received assistance with their irrigation installation and water application problems in 2,513 counties. Surface drainage is especially important in the application of water to crops in humid areas and more than 127,000 farmers in 2,407 counties received assistance with drainage problems.
16. Nearly 225,000 Families Assisted on Housing Problems: In 1950 more than half of all farm houses in the United States were over 30 years old. Many were in poor condition and provided substandard shelter for farm families. Less than half had running water.

In recent years the rate of farm home building has made rapid strides, both new and remodeling. The State Extension Services provide assistance through:

1. Workshops for farm families on building plans.
2. Training schools for commercial builders and handlers of building supplies.
3. Educational work with credit agencies and farmers on problems of financing.

In 1954, 224,784 families received assistance from home demonstration and agricultural agents in building new homes or remodeling old ones.

17. Extension Farm Forestry Program Produced Valuable Cash Crops for Farmers: During the past year Extension Farm Forestry in the United States has emphasized tree planting, woodland improvement, harvesting the tree crops, production of maple syrup and naval stores, and the manufacture and marketing of farm woodland products. Over 525,000 farm people received Extension assistance in these enterprises. Farm woodland products now bring American farmers \$700,000,000 a year. The dollar value of forest products has increased seven times since 1940.

Sawmills, pulp and paper plants and other business groups, including fertilizer concerns, merchandising houses and banks are cooperating with the State Extension Services in advancing the objectives of farm forestry. Farmers were assisted with the planting of forest trees for erosion control, windbreaks, shelter belts and for the production of Christmas trees and forest products. Planting machines made available by sawmills and banks, together with planting stock provided free of charge by industry, greatly stimulated tree planting on thousands of farms.

The Florida Extension Service reports that during the 1953-54 planting season, 2,058 farmers and others received through county agents 12,537,000 pine tree seedlings of which better than 7,000,000 were given free to farmers and 5,500,000 trees were purchased. Ninety-five percent of the free seedlings distributed through the Extension agents to small landowners were donated by seven pulp mills operating in Florida.

18. Extension Helps in Rural Electrification Program: The Extension Service is actively cooperating with the Rural Electrification Administration in its endeavor to increase the beneficial use of electrical energy in the farm home and on the farm. The use of electricity on farms has continued to increase very rapidly. The continuing shortage of farm labor and the necessity for increasing the efficiency and economy of farm operations have caused farm people to make use of more and more electrical equipment. However, it has been estimated that 90 to 95 percent of the farms now using electricity are inadequately wired for their present electrical load, thus creating a fire hazard and possible damage to equipment.

Extension agricultural engineers are making information available through county agents to farm people that will enable them to determine the adequacy of their own wiring system and to aid them in planning for rewiring. By working with other groups who are also concerned, effective wiring programs were organized in many States. Training meetings, wiring workshops, and farm electrification short courses were held. For example, in Wisconsin, 79 leader training meetings were held and it was estimated that wiring and lighting was improved on 5,000 farms.

A water system is considered to be the most important item of farm electrical equipment and extension agricultural engineers have organized educational programs and campaigns in many States with the cooperation of power suppliers, well drillers, pump dealers and others. Extension engineers worked with national organizations in the preparation of educational and informational material, slides, filmstrips and other teaching materials for the use of extension agents and others in aiding farm people with their problems.

19. Land Appreciation Schools and Land Judging Techniques Developed in 35 States: Based to a large extent on pioneer work done in holding

training schools in land appreciation and land judging by the Oklahoma Agricultural Extension Service, this method for the determination of the proper use and treatment of land, with minor adaptations, has been developed in about 35 States. Estimates are that more than 100,000 adults and young people took part in 1954 as compared with about 10,000 in 1950. A common appraisal is: "It is the most effective educational device for teaching the meaning of land use we have."

20. Guidance on Farm Records, Income Tax, and Social Security Given to Farmers: The 1954 revisions in income tax and social security legislation made farmers greatly interested in educational work related to these programs. With thousands of farmers wanting to report farm income, but with very few records, they are calling on Extension workers for guidance. More than a million farm families participated in Extension meetings where the new programs were explained last year in cooperation with representatives of Internal Revenue Service and Social Security Administration. New educational materials are being prepared, with the help of Internal Revenue Service and OASI, for use at meetings to be held next winter when 5 million farmers will be making out their income reports. In 1954 about half the States were active in this work. This year there is a more widespread Extension program which will include nearly every State.
21. Good Home Management Practices Stressed: Good management in the home leads to a higher standard of living even without additional income. The home economics Extension program has stressed the development of knowledge which will make decisions as to the use of time, money, and energy realistic in terms of balancing one with the others.

Possibilities for reducing dollar expenditure by utilization of family time and energy to produce certain goods and services needed by the family have been presented to farm families. The development of skills which will enable people to do things for themselves and so release dollars for other purposes has been encouraged through "how to do" demonstrations.

State Extension programs have been expanded and intensified in home management, production and preservation of food, home sewings and making household furnishings in order to improve the level of living of farm families through the home production of goods for family use. Special attention was directed by the State home demonstration workers to young families who have been encouraged to consider the variations in financial need as their families expand, develop, or contract, and to become familiar with good business arrangements for the family. Attention was also directed to older family members to make plans and prepare for the period of declining years and reduction of active farm management.

22. Use of General Services Administration Stores Depot Facilities:
Arrangements have been made for making General Services Administration Stores Depot facilities available to Cooperative Extension Services in all States and Hawaii, Alaska and Puerto Rico. Under this arrangement, Extension Directors in each State or Territory may procure supplies and equipment from stores depots in essentially the same manner as other agencies of the Department of Agriculture. Payments to the General Supply fund will be made by the Extension Service in each State or Territory from the funds available for Cooperative Extension work. These arrangements have been made because of the Federal participation in this joint program and in order to promote economical use of Federal and cooperative funds in Cooperative Extension work.

The Department is also cooperating with the General Services Administration in developing arrangements whereby Cooperative Extension Services in the various States and Territories may expand their limited use of Federal Supply Schedules.

(b) Salaries and Expenses, Federal Extension Service

	Administration and Coordination	Penalty Mail	Total
Appropriation Act, 1956	\$1,920,000	\$1,650,000	\$3,570,000
Proposed supplemental, 1956, for increased pay act costs	110,000	- -	110,000
Base for 1957	2,030,000	1,650,000	3,680,000
Budget Estimate, 1957	2,065,000	1,650,000	3,715,000
Increase for specialized program leadership to the States for intensive educational work in low income areas under the Rural Development Program	+35,000	- -	+35,000

PROJECT STATEMENT

Project	1955	1956 :(estimated):	Increase	1957 :(estimated):
1. Coordination, adminis- tration, and program leadership of cooperative: extension work	\$1,616,770	\$2,030,000	+\$35,000	\$2,065,000
2. Penalty mail for cooper- ative extension agents .	1,548,544	1,650,000	- -	1,650,000
Unobligated balance	116,710	- -	- -	- -
Total pay act costs (P.L. 94)	[28,524]	[116,800]	[+1,500]	[118,300]
Total available or estimate:	3,282,024	3,680,000	+35,000(1)	3,715,000
Transferred to:				
"Salaries and Expenses, Agricultural Research Service	+408,369	- -		
"Research on Strategic and Critical Agri- cultural Materials, Agricultural Research Service"	+3,260	- -		
"Salaries and Expenses Forest Service"	+170,000	- -		
Transfer in 1956 estimates:				
to "Salaries and Expenses: Office of Information, Agriculture"	+3,847	- -		
Proposed supplemental due to pay increases	- -	-110,000		
Total appropriation or estimate	3,867,500	3,570,000		

INCREASE

(1) An increase of \$35,000 to provide administration and program leadership in the intensified program in low-income areas under the Rural Development Program,

Need for Increase and Plan of Work: The amount of \$35,000 is needed to provide necessary administration, coordination and specialized program leadership with the States to aid in carrying out an experimental program of intensified cooperative Extension assistance for the development of agriculture's human resources in selected low-income farming areas. A small staff will be employed in the Federal Extension Service to provide planning, coordination and leadership in the development of this new program. They will assist State and county Extension workers in organizing programs of work around the special needs of the low-income and part-time farmers in the pilot counties. They will provide liaison and direct contact in effecting necessary coordination with other Federal agencies within and outside the Department of Agriculture. They will be responsible for leadership in the cooperative development of this program within the Extension Service and between Extension and the other agencies and interests, both public and private, which will assist in this effort. They will assist in determining the methods and techniques required to make such a program effective and successful and in evaluating results.

CHANGES IN LANGUAGE

The estimates include proposed changes in the language of this item as follows (new language underscored; deleted matter enclosed in brackets):

Administration and coordination: For administration of the Smith-Lever Act, as amended by the Act of June 26, 1953 ([Public Law 83] 7 U.S.C. 341-348) and the Act of August 11, 1955 (69 Stat. 683-4)), and extension aspects of the Agricultural Marketing Act of 1946 (7 U.S.C. 1621-1627), and to coordinate and provide program leadership for the extension work of the Department and the several States, Territories, and insular possessions, [\$1,920,000] \$2,065,000.

The change in language proposes to insert the U. S. Code citation for the Smith-Lever Act as amended by the Act of June 26, 1953, and reference to the amendment of August 11, 1955 (Public Law 360) which provides for additional extension work in certain agricultural areas which are at a disadvantage because of special circumstances.

STATUS OF PROGRAM

General: The Federal Extension Service functions in the following broad areas:

- (a) Administers the nationwide system of cooperative Extension work, through the State Land-Grant Colleges and Universities, and exercises responsibilities under Federal laws governing this work.
- (b) As the educational agency of the Department of Agriculture, coordinates the educational activities of the Department and provides national leadership to insure a modern, progressive, highly productive and efficient educational program to assist farm families to apply research results to modern-day agriculture. The States look to the Federal Extension Service for national leadership in the over-all planning and direction of the work..
- (c) Maintains close liaison with the research and action agencies of the Department, and as the coordinator of the educational work of the Department, integrates such work into the educational work of the States and counties; works closely with other Departments of government and national private and public organizations and groups in order that all national effort of significance is coordinated with Extension work in each State and Territory.

Selected Examples of Recent Progress:

1. Responsibilities of the Department and Land-Grant Colleges Clarified:
In order that the partnership between the United States Department of Agriculture and the State Extension Services can operate more efficiently, members of the Federal staff advise and consult with Land-Grant College and University Presidents, College of Agriculture Deans, State Extension Directors and others, in interpreting Federal legislation and Department of Agriculture regulations affecting broad Extension Service administrative policies, plans, and operations. They also advise the Land-Grant College officials on the most efficient type of Extension organization, the most effective form of county and State Extension advisory groups, and the most modern and effective informal teaching procedures and methods. During the past year, the Department and the Land-Grant Colleges revised and modernized the Memorandum of Understanding under which cooperative Extension work is carried out. This revision more clearly defined the responsibilities of each of the partners.

In its administrative role, the Federal Extension Service differs from most Federal agencies, in that it does not exercise full managerial control over programs within the States but rather as a partner in the Cooperative Extension Service. As a cooperating partner the Federal Extension Service provides effective leadership and professional assistance that result in improved extension programs and administration in each State. As a result of this effective leadership, Cooperative Extension work is recognized as a national service with sufficient flexibility to best meet local needs.

Administrative Procedures Simplified: A revised personnel procedure eliminating several forms was developed and put into effect which provides better personnel management records. More than 18,000 personnel actions for cooperative employees were processed during the year.

Fiscal and management examinations were conducted during the year in each State and Territorial office. A review was made of 1,400 plans of work from the 48 States and 3 Territories. More than 500 project agreements covering work between the Department and the Land-Grant Colleges were revised to reflect the current work performed and the manner in which it is conducted. To reduce the cost of administering the Penalty Mail Act, and to comply with laws governing the expenditure of Federal funds, procedures were established and put in operation to facilitate the control of mailing costs of more than 60,000,000 pieces of mail, from approximately 4,000 mailing outlets.

2. Farm and Home Unit Approach Strengthened and Improved: Strengthening and further improving Extension work through the farm unit approach was a major activity of the Federal Extension Service during the past year. Leadership and direct assistance for all State Extension Services was provided by a special Federal Extension Service task force. Attention was first given to developing objectives, organization, educational methods and procedures to serve as guides in installing and integrating the unit approach as an educational method throughout the nation-wide system of cooperative Extension work. Attention was directed to intensive training of all program staff members in application of the unit approach as an educational method to enable them to provide leadership and assistance to State Extension Services in the development, formulation and execution of Extension work. During the past year two training workshops on the farm and home unit approach were held in each of the Southern, North Central, and Western regions. One workshop was held in the Northeastern region. The Federal Extension Service assisted most of the States in holding special training sessions for their employees. Courses in the farm and home unit approach were taught at all regional summer schools for extension workers. As a result of the leadership and assistance provided by staff members of the Federal Extension Service, practically all States are now actively engaged in the application of the educational method referred to as the farm and home unit approach in cooperative extension programs.
3. Recommendations Developed for Strengthening Clean Grain Program: Insects, rodents and birds damage and destroy about 250 million dollars worth of grain annually. In addition to the economic loss, contamination of food grains is a serious problem for producers, handlers and processors of food grains. Pure food laws and regulations prohibit the use of contaminated grains in bread and other cereal food products.

An Extension Clean Grain Committee is working with the State Extension Services and national industry organizations in developing and conducting educational programs to reduce losses and eliminate contamination of food grains. During the past year the Federal Extension staff has intensified their leadership in this field. A survey has been made of existing State extension programs for use in determining ways and means of expanding and further developing educational work on clean grain. Educational program aids have been prepared and made available to the States on effective program organization and operation. Direct contacts have been made in all of the important grain States to give assistance

in plans and procedures for strengthening clean grain educational work. Recently a national clean grain educational conference was sponsored by the Federal Extension Service with about 100 representatives of industry and public agencies attending to study current programs and to make recommendations for further development. The result of this meeting was the development of recommendations for strengthening and improving the program. These recommendations will be carried out through Extension leadership.

4. Leadership in 4-H Club Work Given: Assistance is given to State Extension Directors and 4-H Club Leaders, through consultative help, in analyzing State situations, determining needs, developing techniques, procedures and methods as a basis for a sound Extension educational 4-H program in each State and Territory. A series of teaching aids, designed to motivate a greater "Understanding of the Developmental Needs of Youth," was prepared and made available for the training program of more than 300,000 volunteer 4-H Club leaders.

The Federal Extension staff organizes and directs the program of the National 4-H Club Camp. It is during the National Camp that 4-H Club members, State Club leaders, and members of the Federal staff work together in the development of many phases of the total 4-H program that reflects its influence on the local club in the rural community.

5. Home Demonstration Leaders Encourage Use of Total Family Resources: Home economists on the Federal staff have developed a program giving consideration to the inter-related use of time, energy, and money by the family and the possible savings in the use of each of these through increased knowledge or skill. State home demonstration leaders, with special assistance to new home agents were given leadership and training in evaluating work underway and its effectiveness; in studying all resources within the State that have a bearing on family and community problems; and in working out priorities for basic activities to be undertaken at the State and County level. Current home economics research data from Federal and State sources was reviewed and distributed on a selective basis to State extension specialists. For example, nutrition subjects covered included: food preservation, preparation and composition, time-saving meals, food habits and needs of teenagers, and food conservation. Assistance was given at regional and State workshops and summer schools in training Extension home agents in application of the farm and home unit approach; county program planning based on needs of the area; evaluating the effectiveness of their work; and Extension methods. The Federal staff assisted in the national development of the home economics programs through work with such organizations as the National Home Demonstration Agents Association composed of 3,800 county home demonstration agents, and the National Home Demonstration Council which has a membership of over one million women, largely farm and rural.

6. New Educational Program in Commodity Utilization: Educational work of an intensified nature on the utilization of agricultural commodities was initiated by the Federal Extension Service in 1954. The objective of this program, which is carried out in cooperation with the State extension services, is to aid in the more rapid application and use of research by processors of agricultural products in efficient processing methods, new product development, and in the expansion of markets for processed commodities. Educational work in this field is based on the research of the regional utilization laboratories of the U. S. Department of Agriculture, State Land-Grant colleges, and other institutions engaged in utilization research.

The current program is featuring work in three major commodity areas: cotton, grain crops, and fruits and vegetables. In conjunction with the extension services of the cotton States, the program of wider cotton utilization is based on research of the Southern Utilization Research Laboratory at New Orleans, other research in the Department of Agriculture, and private research agencies. Special emphasis is being placed on developing the use of the new cotton opener and the loom attachment for making a special type of woven fabric developed by the New Orleans laboratory. Other work of current interest to the mills and of benefit to cotton producers relates to nap control, special fire and water resistant fabrics and to fiber strength testing. In grain crops, emphasis is being directed to the use of antibiotics in feeds, improved grain storage, and grain products processing. Work in fruit and vegetable utilization includes assistance to potato processors on new and improved peeling methods, sanitation practices, methods of processing and pilot work on processing tomato juice powder and de-hydro-freezing methods for various fruit and vegetable products.

The Federal Extension Service has employed a utilization specialist in each of the above three fields to work with State extension services and industry in developing the utilization program. This work will be expanded to include milk and other dairy products.

7. Production and Marketing Adjustments Accomplished in Broiler Industry Through Timely Information: During March, 1955, the broiler industry became concerned over the anticipated increase in the quantity of broilers that would be reaching the market during late April and May. In view of this concern, the Federal Extension Service prepared background and current information on broiler placements and prices for the use of State Extension Services. This was used by the State Extension Services in making an analysis of the local broiler production and market situation, which was disseminated in terms of producer, processor, distributor, and consumer interest. This information, which was made available to all segments of the broiler industry, was an important factor in preventing the decline of producer prices to the level anticipated and shortening the period of depressed prices. By anticipating the low prices, producers marketed earlier at lighter weights. The information provided consumers indicated that broilers

were an unusually good buy, which resulted in an increase in the movement through the market. As a direct result of the total educational and informational effort, broiler prices at their lowest point were 4¢ per pound above the price expected by the industry. Timely information enabled broiler producers, processors, distributors and consumers to make their own decisions that resulted in bringing about desired production and marketing adjustments.

8. Extension Research and Training Leadership is Provided: Leadership is provided to State Extension Services in the use of the scientific approach in the educational process to the solution of Extension problems, and in the development of staff training programs. The aim is the continuous improvement of Extension teaching methods through the development of facts, and through adequate training, keeping Extension workers alert to current changes in the use of effective teaching methods. This work resolves itself into two broad areas of Extension research and personnel training.

Extension research related to program progress and accomplishment, includes studies of the effectiveness of Extension teaching methods. Extension research relating to the operation of the Cooperative Extension Service as an educational enterprise, includes items such as studies of organizational structures, functions of staff groups, administrative and supervisory procedures, reports and reporting procedures, penalty mailings and relationships between State Extension Services, county governments, and official Extension advisory committees.

The dynamic character of the Extension teaching enterprise combined with the ever-increasing complexities of agriculture and rural life, emphasize the need for well-trained, alert and aggressive State and county staffs, capable of growth and development throughout their Extension careers. The Federal Extension Service is encouraging the States to re-examine undergraduate curricula in agriculture and home economics from the standpoint of the adequacy of training offered prospective Extension workers.

The workshop on Extension Regional Summer Schools held at Purdue University last September, and participated in by those responsible for instruction at the five regional Extension summer schools, dealt with the coordination of program offerings and with the scope, objectives, and areas of emphasis for nine major courses (farm and home development, program building, principles of group work, psychology for Extension workers, communications, youth programs, evaluation, Extension work in public affairs and Extension teaching). At an Extension Research Workshop held in Washington in May national leaders and representatives from the States developed principles, guides, and recommendations for use by State and Federal Extension personnel using the scientific or research approach to the solution of Extension problems.

9. Communication Methods and Teaching Materials Developed as Effective Educational Tools: Cooperative State Extension services were assisted in developing communication programs and policies to reach more people faster, and in training county Extension workers and State Extension specialists in the educational use of visual aids and mass communication media as effective educational tools.

Emphasis on training county Extension agents in educational use of television continued. Nineteen States were assisted in conducting 93 TV workshops for Extension agents, in which over 2,000 agents were given demonstration training in how to use television. As a result Extension agents report participation in 43,000 television programs during 1954 compared to 4,600 the preceding year.

Similarly, State Extension services were assisted in training agents in the use of radio, newspapers, magazines, visual aids, and other communication media and devices as a part of these Extension teaching methods.

Federal Extension Information Specialists during the year served as leaders in a national communication workshop for Extension workers, in interstate communication planning and training conferences, in working with a national advisory committee of State Extension editors, and in producing for State Extension educational use nearly a half million copies of 37 publications, 2,500 color slides, 6 filmstrips, and hundreds of photographs and visual drawings. This, together with a steady flow of policy, research and situation news from the Department to State Extension workers, was instrumental in keeping State workers informed, helping them to use more effective teaching methods and providing needed teaching material.

STATEMENT OF OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS

(Includes only those amounts which, by November 30, 1955, were actually received or programmed for 1956 or 1957. Since work for other agencies is performed on a service basis, at the request of those agencies and for their benefit, it is not practicable to estimate in advance the amounts to be received in most cases.)

Item	: Obligations : : 1955 :	: Estimated : : Obligations : : 1956 :	: Estimated : : Obligations : : 1957 :
Working Funds:	:	:	:
(Advances from other agencies and funds):	:	:	:
Administrative Expenses, Section 392, Agricultural Adjustment Act of 1938 - Advance for technical assistance rendered Agricultural Stabilization and Conservation Committees in the administration of programs in Alaska	: \$800 :	: \$800 :	: \$800 :
Local Administration, Section 388, Agricultural Adjustment Act of 1938, Agriculture - Advance for technical assistance rendered Agricultural Stabilization and Conservation Committees in the administration of programs in Alaska	: 4,500 :	: 4,500 :	: 6,700 :
Total	: 5,300 :	: 5,300 :	: 7,500 :
International Cooperation Administration - For expenses in connection with training and technical assistance activities ..	: 67,403 :	: 105,800 :	: - - :
Trust Funds:	:	:	:
Miscellaneous Contributed Funds, Department of Agriculture:	:	:	:
For cooperative work with land-grant colleges on appropriate in-service training activities through summer-session courses for extension workers	: 1,978 :	: 2,000 :	: 2,000 :
For a cooperative study to evaluate progress and effectiveness of the International Farm Youth Exchange Program	: 1,366 :	: 1,679 :	: - - :
Return of unused portion of funds advanced by National 4-H Club Foundation in connection with the International Farm Youth Exchange Program	: 6,522 :	: - - :	: - - :
Total, Miscellaneous Contributed Funds	: 9,866 :	: 3,679 :	: 2,000 :

Item	: Obligations : : 1955	: Estimated : : Obligations : : 1956	: Estimated : : Obligations : : 1957
Obligations Under Reimbursements	:	:	:
From Governmental and Other Sources:	:	:	:
Federal Extension Service:	:	:	:
From the proceeds of the sale of	:	:	:
personal property, and from	:	:	:
various other government sources:	:	:	:
for personal services, transpor-	:	:	:
tation of things, taxes and	:	:	:
assessments	5,892	614	- -
TOTAL, OBLIGATIONS UNDER ALLOTMENTS	:	:	:
AND OTHER FUNDS	88,461	115,393	9,500

FARMER COOPERATIVE SERVICE

Purpose Statement

The Farmer Cooperative Service was established following the enactment of the Farm Credit Act of 1953 (Public Law 202, August 6, 1953), which transferred the research and technical assistance work for farmers' marketing, purchasing and service cooperatives, under the cooperative Marketing act of 1926 from the Farm Credit Administration to the Secretary of Agriculture. The Service conduct research and carries on related advisory and educational activities on problems of organization, financing, management policies, merchandising, costs, efficiency, and membership. The Service works closely with cooperatives to help the three million farmers who are members of such organizations improve the operations of their businesses. It cooperates with the Extension Service, Land-Grant Colleges, Banks for Cooperatives, State Departments of Agriculture, and other agencies to bring about better understanding and application of sound cooperative principles and practices. The Service also advises other Federal agencies on problems relating to agricultural cooperatives.

The Service carries on its work through three program divisions - Marketing, Purchasing and Management Services. On November 30, 1955 the Service had 102 employees, 99 of whom were full-time and 3 part-time, all stationed in Washington, D. C.

	Estimated Available, 1956	Budget Estimate, 1957
Salaries and Expenses	\$432,400	\$577,000

Salaries and Expenses

Appropriation Act, 1956	408,000
Proposed supplemental, 1956, for increased pay costs	24,400
Base for 1957	432,400
Budget Estimate, 1957	577,000
Increase (to strengthen research and technical assistance for farmers' cooperatives)	<u>+144,600</u>

PROJECT STATEMENT

Project	1955	1956 (estimated)	Increase	1957 (estimated)
1. Research and technical assistance for farmers' cooperatives	400,104	432,400	+ 144,600	577,000
Unobligated balance	7,896	- -	- -	- -
Total pay act costs (P.L. 94) ...	[7,114]	[24,750]	[+8,500]	[33,250]
Total available or estimate	408,000	432,400	+144,600	577,000
Proposed supplemental due to pay increases	- -	-24,400		
Total appropriation or estimate ..	408,000	408,000		

INCREASES

(1) An increase of 144,600 to expand and accelerate the program of research and technical assistance for farmers' cooperatives.

Need for Increase: There is an urgent need for additional funds to enable the Farmer Cooperative Service to assist farmers in reducing production and marketing costs by increasing the efficiency of their marketing and production supply buying cooperatives and to adequately meet continuing requests from farmer cooperatives, land-grant colleges, and farm organizations for research and technical assistance for farmer cooperatives.

Areas in which such work is needed include:

1. Improving the Operations of Farmers Production Supply Cooperatives.

There is urgent need to improve the operations of farm supply cooperatives. Since the average farmer now spends between \$3,000 and \$3,500 annually or nearly 50 percent of his cash farm income for production supplies, improvement in the operations of associations handling these items would materially help millions of farmers reduce their costs and increase their general farming efficiency. Significant problems of these associations requiring additional study are: Methods of credit extension and collection,

inventory control, and merchandising methods. Research is required on ways of coordinating operations of these associations to achieve greater efficiency and to obtain better quality supplies. There also is need for studying ways by which these associations can contribute to lower production costs through the bulk delivery of feed, fertilizer, and petroleum products.

2. Organizational and Operating Problems of Farmer Marketing Cooperatives. Farmers need stronger and more effective cooperatives to reduce their marketing costs. Many cooperatives were formed in a period when the area that could be served economically was much smaller. Today improved transportation and mechanization of processing and handling operations makes possible much larger individual cooperatives. Work is needed on methods of bringing about orderly consolidation of existing local associations, integration on a regional or national basis to help farmers gain economies of large-scale marketing operations, protect their investments and maintain membership in cooperatives. Consolidation would be particularly effective in strengthening cooperatives handling dairy products, fruits, vegetables, and eggs.

There are hundreds of farm communities in which needed livestock and crop adjustments are not being made because there are no adequate local market outlets for products that would be grown if desired shifts in production took place. Study is needed on how to improve local marketing services, particularly for producers of livestock, poultry, eggs, fruits, and vegetables.

Studies of marketing and other distribution problems of rice cooperatives are needed in order to assist them to function more effectively. Work is needed to help sugarbeet bargaining cooperatives improve organization and operations so as to better serve producers.

Cooperative tobacco warehouses are increasing in number each year. Study is needed of the factors which contribute to their success or failure. The results of such study will greatly strengthen existing cooperatives and will also assist growers in other areas in deciding whether to undertake cooperative warehousing operations.

A survey of the extent to which important cooperatives in various commodity fields are finding it possible to export commodities would help farmers in finding markets for their products.

Farmer cooperatives have always had an important part in the various farm programs designed to bring about better quality products, orderly marketing and improved prices for agricultural products. Study is needed to determine the most effective way cooperatives can participate in farm programs and what services should be performed by them so as to best meet the needs of farmers and the public.

3. Financing and Management Problems of Cooperatives. Cooperatives have a pressing need for more study and analysis of their financial structures and programs. They are confronted by increasingly difficult problems, especially those relating to revolving fund financing, and the effect of debt financing on cooperative structures. These problems have been intensified by recent changes in Federal income tax laws.

There is a widespread interest and demand for studies dealing with the levels of managerial compensation and the development of better management in farmers' cooperatives. Competitive employment conditions require that associations be assisted in solving incentive payment and other employee compensation problems. Studies of methods for improving membership communication and developing greater recognition of membership responsibility in cooperatives are urgently needed.

4. Improving the National Statistics on Agricultural Cooperation. The basic statistics on agricultural cooperation, compiled annually by Farmer Cooperative Service, from information voluntarily furnished by the 10,000 marketing, farm supply and related service associations, are widely used by cooperatives, land-grant colleges and other agricultural workers, and public officials. There is urgent need for more detailed statistical studies which will provide usable information on physical quantities and types of major commodities marketed and farm supplies handled, as well as other essential data. This need has been intensified by the growing diversity of cooperative operations. These additional studies not only will disclose important trends in respective farm commodity and supply fields but they will qualitatively strengthen the basic statistics and thus improve public understanding of cooperative methods and operations.
5. Organizational and Operating Problems of Farmers' Mutual Insurance and Irrigation Companies. Farmers mutual fire insurance companies represent one of the most widespread forms of rural cooperation in the United States. Current trends toward larger and more commercialized farms, together with increased building values and repair costs have brought changes in the insurance needs of farmers. To do a better job in guiding these insurance companies through this period of changing agricultural conditions, farmer directors and officials of farm mutual insurance companies need technical assistance on reinsurance methods, loss prevention programs, classification systems, and the use of new policy forms as well as on other improved management and operating techniques.

Research and educational work is also much needed on the organization and operation problems of mutual irrigation companies, which now furnish about one third of all water used in irrigation.

Plan of Work:

1. Initially the operations of selected local and regional farm supply associations known for their outstanding records of performance will be studied. Findings will be made available to managers and directors as guides for establishing improved operating practices. As further information is obtained, studies will be expanded to include applicability of findings to associations operating under varied conditions and in different geographic areas.
2. Problems involved in the strengthening of cooperative marketing associations by consolidation or better coordination of operations to increase efficiency and lower costs will be analyzed for selected associations in various commodity fields. Effects of new methods of handling which require larger unit volume by cooperatives for efficient operations will be appraised.

Successful practices, suggestions for market development, and pitfalls in operating cooperatives in areas nearby large consuming centers will be studied. Pilot plant studies to test and evaluate, under practical farm conditions, the various practices and procedures for local farm markets will be started.

Operating practices, costs, services and methods of selling, will be analyzed for rice cooperatives. Services, methods of operation, problems and growth of cooperative tobacco warehouses will be studied in order to assist in strengthening existing associations and to determine whether it would be advantageous for growers in other areas to undertake cooperative warehouse operations. The operations of sugarbeet bargaining associations will be analyzed to determine how they may improve their methods of bargaining, pricing, and other services to producers.

Experiences and extent of export business of cooperatives will be studied to determine the possibilities for developing this business. Services and activities of selected cooperatives will be studied in connection with their contribution to farm programs for various commodities. These studies will determine how cooperatives can help improve these programs for the benefit of their members and other farmers.

3. Initial studies will be made of the advantages and disadvantages of the use of debt financing by cooperatives, and of problems involved in the use of the revolving capital plan. Surveys of cooperative managerial training methods and needs and of managerial compensation levels in cooperatives will also be undertaken. Research will be conducted to develop methods of better membership communication in cooperatives.

4. More detailed analysis of questionnaire data, largely already available to Farmer Cooperative Service, will be undertaken to measure important trends of change and growth in the various commodity and farm supply cooperatives.
5. Studies will be conducted of management problems of mutual insurance companies, with special emphasis on loss prevention programs and reinsurance methods and procedures. Problems of mutual irrigation companies now functioning in the western states will be studied in an effort to assist these organizations in improving their operations, and to determine the applicability of their organization structures and operating methods to conditions existing in other areas.

Current Activities: The Farmer Cooperative Service conducts research, educational and service work for the benefit of farmers through their approximately 15,000 marketing, purchasing and other business cooperatives. The Service acquires and disseminates information relative to farmer cooperatives, and publishes such information and findings as may be useful to further the sound development of such cooperatives in the United States. This work is carried on in cooperation with land-grant colleges, Federal and State extension services, and State Departments of Agriculture. Many research projects are conducted in order to help the cooperatives answer the many problems arising under changing economic conditions.

Selected Examples of Recent Progress: The Farmer Cooperative Service completed work on 81 projects or specific phases of projects during the fiscal year 1955. About the same number will be completed in 1956, and it is estimated that 80 will be completed in 1957.

The following activities are typical of the work of the Farmer Cooperative Service:

Services of Grain Cooperative Broadened. -- A grain association in a southern state, organized in 1950, now provides an excellent market for local farmers in that area. At the request of the Association's board of directors a study was made by Farmer Cooperative Service in cooperation with the State Extension Service and the Experiment Station which indicated that the association effectively could provide members with a custom feed grinding and mixing service which would also permit adding other ingredients to the farmers' grain and for mixing molasses with their hay and other roughages to give them low cost feed for their livestock. This was recommended with the idea that as the service proved its worth the manufacture of complete balanced formula feeds could be undertaken. General ideas as to mill types and plant lay-out also were given. After the suggested course of action was approved by the board of directors and members, engineering and construction firms were engaged by the cooperative. The installation of needed facilities is underway.

Regional Grain Marketing Operations Improved. -- In the fall of 1954, a midwestern regional cooperative association requested a study of the association's grain marketing and storage facilities and operations to improve efficiency and service to farmers. A study was made of 143 member country elevator plants and of the association's terminal facilities and operations. Recommendations were made to the association's management and board of directors designed to consolidate and modernize all farmer owned grain marketing facilities and expand storage capacity during

the next 5 to 10 years. Based on current operating costs the recommended program should lower marketing costs by at least 40 percent or by at least 3 cents per bushel and result in total savings to farmer patrons of at least \$2 million annually. The association's board of directors has voted to begin this year to put the principal parts of the recommended program into operation.

Coordination of Milk Cooperative Operations for Kansas City Market. — This study was made to assist the principal milk bargaining association and a dairy manufacturing and distributing cooperative in coordinating their marketing activities. The two cooperatives serve over 4,000 producers in the Kansas City milkshed, and are vitally concerned with efficient marketing of Grade A milk in the Kansas City area and developing a dependable outlet for surplus milk. The study showed that additional facilities for handling fluid milk are needed by both associations and their total cost to farmers can be reduced by developing a coordinated program that will eliminate unnecessary duplications of facilities. It was recommended that a new Grade A receiving facility be built near the existing plant of the processing cooperative and that additional manufacturing facilities which may soon be needed should be located outside Kansas City. It was suggested that new facilities be owned and operated by a subsidiary of the two cooperatives. The findings of the study will help the associations market surplus Grade A milk more effectively and thus reduce costs and increase returns to producers.

Potato Growers Cooperative Sales Agency Strengthened. — This study was made to determine how a western potato marketing federation could improve its services to members. It was found that substantial changes are needed to revitalize sales activity and regain widespread support from the potato and onion producers in the area served. As a result of this study, the association has taken the lead in developing a state-wide campaign to improve the quality of potatoes, and has strengthened its own sales services in terminal markets. These actions by the cooperative, based on the Service recommendations, should build a greater demand for their products and thus increase returns to their members.

Egg Marketing Opportunities for Dairy Federation Appraised. — At the request of a federation of more than 100 cooperative creameries operating in a midwestern state, a study was made to determine the feasibility of broadening this federation's services to include the marketing of eggs for its member associations. The study showed that important benefits could be derived from a well-developed program of egg quality production, local assembling, and uniform handling, and from joint and coordinated central packing and selling. It was recommended that the association market eggs for member associations and

this recommendation is now under consideration. This new marketing service would (1) reward producers for high quality eggs, (2) provide a dependable year-round market, (3) provide better quality to consumers, (4) strengthen the cooperative's financial position through an increased volume of business, and (5) lower per-unit costs of handling butter both in the member creameries and in the federation.

Feed Mill Relocation Can Reduce Costs. — At the request of the board of directors, a study was made of the feed manufacturing and distributing operations of a midwestern association. Manufacturing and transportation costs were assembled and analyzed. Type of plant and operating practices were carefully considered. Recommendations were made that a modern mill replace the present inefficient facility at a new location to take advantage of more economical and improved transportation facilities and services. By acquiring a plant more nearly in the center of its distribution area, it is estimated that handling and distribution costs can be reduced \$2 a ton, which on the basis of 20,000 tons annually, would result in total savings of \$40,000 in addition to improved services.

Group Insurance Plans for Employees of Farmers' Cooperatives Analyzed. — This study analyzed the various types of group insurance plans being used by farmer cooperatives. While many of the associations now have such plans, others are interested in finding plans suitable for their operations. In this study costs of various insurance plans, factors affecting these costs, and benefits provided by different types of plans were reported. Eligibility provisions and methods of determining the amount of benefits provided for each employee also were examined. A suggested procedure for setting up a satisfactory group insurance plan was then developed. This information will be useful to those cooperative managers and directors who have not developed satisfactory group insurance plans. By helping these cooperatives obtain and hold experienced and trained personnel this project will result in improved operating efficiency by cooperatives.

Research Problems and Policies of Regional Farm Supply Cooperatives Studied. — This study showed the progress made by regional farm supply cooperatives in developing business research programs; outlined the business research needs of these associations; appraised their existing research practices; and analyzed various problems in establishing a business research department. With marked changes in the production supply needs of farmers, it is important for these associations to develop research on internal operations so as to obtain information for policy decisions and to improve operating efficiency. Findings of this study have been helpful to several regional cooperatives in establishing or expanding their business research programs.

Statistics Compiled on Marketing, Farm Supply, and Related Service Cooperatives. -- Use of the statistical information developed in the annual survey of farmer cooperatives made by Farmer Cooperative Service is steadily expanding. This survey provides the only source of data available on a nationwide basis showing trends in the progress and scope of farmer cooperatives. Many requests for approval to reproduce graphic material and an increasing number of requests for basic data developed in the survey reflect the importance of these statistics to cooperatives, national farm organizations, Federal and State agencies, schools and colleges, and research workers in agricultural cooperation. This greater use of cooperative statistics has been largely the result of major revisions made in statistical procedures in 1950 to provide realistic and useful information reflecting recent changes in cooperative operations. Evidence of the interest of farm cooperatives in the survey is found in the steady growth of their participation by voluntarily supplying data. It is significant that 90 percent of the listed associations supplied information for the most recent survey in 1952-53 as compared with 80 percent in 1950-51.

STATEMENT OF OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS

(Includes only those amounts which, by November 30, 1955, were actually received or programmed for 1956 or 1957. Since work for other agencies is performed on a service basis, at the request of those agencies and for their benefit, it is not practicable to estimate in advance the amounts to be received in most cases.)

Item	: Obligations, : 1955	: Estimated : obligations, : 1956	: Estimated : obligations, : 1957
<u>Allocations and Working Funds (Advances from other agencies):</u>	:	:	:
<u>International Cooperation</u>	:	:	:
<u>Administration:</u>	:	:	:
For expenses in connection with	:	:	:
training and technical assistance:	:	:	:
activities	55,773	12,700	- - - -
<u>Department of Agriculture, Agricultural Marketing Service:</u>	:	:	:
For marketing research activities..	284,393	341,400	358,400
<u>Obligations Under Reimbursements From</u>	:	:	:
<u>Governmental and Other Sources:</u>	:	:	:
Salaries and Expenses	3,065	- -	- -
TOTAL OBLIGATIONS UNDER ALLOTMENTS	:	:	:
AND OTHER FUNDS	293,231	354,100	358,400

SOIL CONSERVATION SERVICE

Purpose Statement

The Soil Conservation Service was established by the Act of April 2 1935 (16 U.S.C. 590a-590f). It assists soil conservation districts and other cooperators in bringing about physical adjustments in land use that will conserve soil and water resources, provide economic production on a sustained basis, and reduce damages by floods and sedimentation. The Service also develops and carries out special drainage, irrigation, flood prevention, and watershed protection activities in cooperation with soil conservation districts, watershed groups, and other Federal and State agencies having related responsibilities.

Conservation Operations Program Activities:

The Service provides technical and other assistance to farmers, ranchers and others through soil conservation districts and other cooperators in the 48 States, Alaska, Hawaii, Puerto Rico, and the Virgin Islands, to carry out locally-adapted soil and water conservation programs. (As of June 30, 1955, farmers and ranchers had organized 2,674 conservation districts.) The assistance furnished by the Service includes (a) soil surveys to provide physical land facts needed to determine the use capabilities and conservation treatment needs of each acre of farm and ranch land and the publishing of soil survey reports and maps which are useful also to other Federal and State agencies and the public in the development of special land-use programs and for other purposes, (b) technical help to farmers and ranchers in developing and applying conservation plans which allow for the best possible use by the farmer or rancher of his land, labor, equipment, and financial resources, (c) the loan of some special types of equipment not readily available to the farmer but needed to establish certain conservation practices, (d) observational studies and field testing of new and improved species and strains of grasses and legumes, trees, shrubs, and other plant materials that may be useful in controlling erosion and improving pasture and range land, and (e) snow surveys and stream-flow forecasts in the Western States to provide for efficient seasonal utilization of available water supplies.

Watershed Protection Program Activities:

The Service has general responsibility for administration of the Watershed Protection program of the Department, and the formulation and development of its guiding principles and procedures. The program consists of (a) cooperating with States, soil or water conservation districts, flood prevention or control districts, or other local public agencies in planning and installing in small upstream watersheds works of improvement designed to prevent erosion, floodwater, and sediment damage, and in furthering the conservation, development, utilization, and disposal of water, and (b) making watershed investigations and surveys to provide for coordination between the Department programs in specific watershed areas and the programs of other Federal, States, and local agencies.

In cooperation with soil conservation districts and other local groups and organizations, the Soil Conservation Service provides technical assistance to farmers and ranchers in these small watersheds in the planning and application of soil and water conservation practices and technical and financial assistance in the planning and installation of water and erosion control measures such as diversion ditches and dikes, waterflow retarding structures, debris and desilting basins, stream-channel improvements, floodways, gully control structures, roadside stabilization measures, etc. The Forest Service participates, generally by cooperating with State foresters, in planning and providing fire protection and furnishing technical forestry assistance to land owners in applying forest and woodland improvement measures on non-Federal lands and by installing all measures on lands under its administration. The Agricultural Research Service furnishes assistance in the assembly, correlation, and analysis of economic data needed in the planning phases of the program. The Weather Bureau and Geological Survey provide assistance in gathering and analyzing hydrologic data.

Flood Prevention Program Activities:

Pursuant to the Flood Control Act of June 22, 1936, as amended and supplemented, and under policies established by the Secretary, the Service has general responsibility for administration of the Flood Prevention program of the Department, and the formulation and development of its guiding principles and procedures. Since the passage of the Watershed Protection and Flood Prevention Act (P.L. 566, 83rd Congress) the program consists of the planning and installation of improvement measures primarily for flood prevention on the 11 authorized watersheds.

The Soil Conservation Service plans and installs works of improvement such as floodwater retarding structures, stream-channel improvements, gully stabilizing and sediment control measures, diversions, floodways, etc., on the 11 authorized watersheds. The improvement measures are installed in cooperation with local soil conservation and flood control districts and other local and State agencies.

The Forest Service carries out similar flood prevention activities on national forests and adjacent range lands and on other forest lands within the authorized watersheds.

Water Conservation and Utilization Program Activities:

Under the authority of the Acts of May 10, 1939 (53 Stat. 685, 719), October 14, 1940 (16 U.S.C. 590-z-10), as amended and supplemented, June 28, 1949 (Public Law 132) and September 6, 1950 (Public Law 760) the Service carries on a water conservation and utilization program in specific project areas. Irrigated and irrigable lands (both Government and privately-owned) are developed for efficient use of irrigation water. Settlement opportunities are provided for veterans and needy farm families through the sale of developed farm units. Technical assistance is furnished to settlers within the authorized project areas with their soil and water conservation and land-use problems. This work has been completed on all projects except the Eden Valley project in Wyoming.

The Soil Conservation Service maintains its central office in the District of Columbia but most of its activities are highly decentralized to forty-seven States and three territorial offices, seven cartographic units, seven engineering and watershed planning units, and about 3,400 area offices and work units which carry on the technical programs of the Service in conservation districts, watersheds, and water conservation and utilization projects. In addition, the Service has a corps of specialists in the fields of agronomy, biology, forestry, information, plant materials, and range conservation who are attached to the Washington office but located at various points in the field, to provide for necessary program coordination and the technical assistance in those specialty fields requested by field operating personnel.

As of November 30, 1955, the Soil Conservation Service had 12,026 full-time employees (235 in Washington and the balance in the field) and 2,580 part-time employees who are generally employed in the field during the seasonal periods when there is need for additional assistance in applying conservation practices.

	Estimated Available, 1956	Budget Estimate, 1957
Appropriated funds:		
Conservation operations	\$63,042,745	\$65,215,000
Watershed protection	a/ 11,994,065	16,000,000
Flood prevention	a/ 10,000,000	10,700,000
Water conservation and utilization projects	b/ - -	232,000
Total	85,036,810	92,147,000

a/ In addition, prior year balances available.

b/ Prior year balances available.

Summary of Appropriations, 1956, and Estimates, 1957

Appropriation Item	: Estimated : Available, : 1956	: Budget : Estimates, : 1957	: Increase (+)
Conservation operations.....	: 63,042,745	: 65,215,000	: +2,172,255
Watershed protection.....	: a/ 11,994,065	: 16,000,000	: +4,005,935
Flood prevention.....	: b/ 10,000,000	: 10,700,000	: +700,000
Water conservation and utilization: projects c/	: - -	: 232,000	: +232,000
Total, direct annual appro- priation.....	: 85,036,810	: 92,147,000	: +7,110,190

a/ In addition, \$1,679,071 is available from prior year balances.

b/ In addition, \$1,707,997 is available from prior year balances.

c/ There is available in 1956 a prior year balance of \$474,500, of which \$100,000 is being carried forward for use in the 1957 fiscal year.

(a) Conservation Operations

Appropriation Act, 1956	59,300,000
Proposed supplemental 1956, for pay act costs	+3,750,000
Activities transferred in the 1957 estimates to "Salaries and expenses, Office of the Secretary of Agriculture" for personnel investigations	-7,255
Base for 1957	63,042,745
Budget Estimate, 1957	65,215,000
Increase	<u>+2,172,255</u>

SUMMARY OF INCREASES AND DECREASES, 1957

Increase to provide technical assistance to new conservation districts and additions to existing districts in planning and establishing soil and water conservation practices	+846,500
Increase to furnish accelerated technical assistance to low-income farmers in selected areas	+477,600
Increase to speed up soil surveys and technical assistance in establishing conservation prac- tices in areas where serious erosion and land- use problems exist, particularly in the southern great plains	+724,165
Increase to accelerate map compilation and the pre- paration and publication of soil maps and survey reports	+208,355
Decrease due to providing a direct appropriation to the General Services Administration for certain leasing costs previously paid from this appropriation .	-84,365

PROJECT STATEMENT

Project	1955	1956 (estimated)	Increase or Decrease	1957 (estimated)
1. Assistance to soil conservation districts and other cooperators:				
(a) Planning, applica- tion and maintenance				
of practices	\$57,654,757	\$62,436,745	+\$4,781,988	\$64,609,000

(Continued on next page)

Project	1955	1956	Increase or Decrease
(b) Observational field testing of con- servation plant materials	549,375	606,000	- -
Subtotal	58,204,132	63,042,745	+2,172,255
Unobligated balance ...	127,170	- -	- -
Total pay act costs (P. L. 94)	[1,104,433]	[3,750,000]	[122,000]
Total available or estimate	58,331,302	63,042,745	+2,172,255
Transferred from "Agricultural adjust- ment programs, Com- modity Stabilization Service"	-650,000	- -	
Transfers in the 1956 estimates to other accounts	+1,396,519	- -	
Transfer in 1957 estimates to "Sala- ries and expenses, Office of the Secre- tary of Agriculture" ..	+7,850	+7,255	
Proposed supplemental due to pay increases	- -	-3,750,000	
Total appropriation or estimate	59,085,671	59,300,000	

Note: Prior year balance of \$1,220,993 was available in 1955 from funds appropriated for emergency channel restoration and flood rehabilitation work, of which \$1,198,253 will be returned to the Surplus Fund of the Treasury.

INCREASES AND DECREASES

(1) A net increase of \$2,172,255 under the project "Assistance to soil conservation districts and other cooperators" as follows:

(a) An increase of \$846,500 to provide technical assistance to new conservation districts and additions to existing districts.

Need for Increase: Farmers and ranchers are continuing to bring their lands within legally organized soil conservation districts. In some instances the landowners and operators form new districts and in other cases their lands are added to existing districts. Some of the additions to districts are quite substantial both in farm acreage and number of farms. It is important that the Service be in a position to render technical assistance to the farmers and ranchers in those soil conservation districts in planning and establishing conservation practices, as soon as the districts are organized and ready to proceed in carrying out their program responsibilities.

Because of the high percentage of the total farms and ranches in the country now within conservation districts, the rate of district organization has gradually declined in the past few years. However, the number being organized yearly is still significant. As of June 30, 1955 there were 2,674 conservation districts comprising 1,484,974,221 acres in the United States, its territories, and possessions. This represents an increase of 56 districts and 22,481,380 acres in the fiscal year 1955. During this same period there were 114 additions to existing districts, totalling 20,997,158 acres. It is anticipated that 66 new districts will be formed in the 1956 fiscal year and another 40 in fiscal year 1957. The \$846,500 increase is to provide funds for the 40 new districts and additional technicians for large additions to existing districts expected in 1957.

Plan of Work: Additional personnel would be employed as soon as possible after the beginning of the fiscal year and placed in older districts for training. As districts are organized or enlarged, experienced personnel from the older districts would be moved to the new districts or additions and would be replaced by the employees who were in training.

(b) An increase of \$477,600 to furnish accelerated technical assistance to low-income farmers in selected areas as an aid in solving their economic problems, as a part of the Rural Development Program.

Need for Increase: There is an urgent need to find a solution to the economic and other problems of low-income farmers throughout the country. The Department of Agriculture, together with other Federal and State agencies, is undertaking an integrated and coordinated approach towards the solution of these problems. The lands of these low-income families are the basic resource of their economy. Data on the soils, topography, erosion, and other related factors will provide the basis for analysis and evaluation of this land resource. The Soil Conservation Service will be responsible for furnishing this data. In some instances the data can be provided from soil surveys and soil maps already made. Additional soil surveys are necessary, however, and the Service would have to supply interpretations of all the survey data and provide technical assistance in the development of farm conservation plans. These soil and water conservation plans will be coordinated with other farm and home management plans in an effort to develop a basis for the farm families in the selected counties to earn the maximum sustained income.

Plan of Work: Additional technicians (primarily soil surveyors and soil conservationists) would be added to work unit staffs in the pilot counties designated for the study. In counties selected that do not have a work unit, one will be established and staffed. These additional technicians would be integrated administratively into the existing organization with the function of concentrating on the problems of low income farms.

(c) An increase of \$724,165 to speed up soil surveys and technical assistance in establishing conservation practices in areas where serious erosion and land-use problems exist, particularly in the southern great plains.

Need for Increase: The extended period of below normal rainfall throughout most of the great plains and particularly the southern part, has demonstrated the hazards connected with farming in that area. Repeated crop failures have annually left thousands of acres devoid of cover and subject to erosion by both wind and water. Considerable damage to these lands has resulted. It is important that this condition be corrected as rapidly as possible to prevent further serious damage to the lands. There is also urgent need to accelerate conservation treatment in other areas of the country where land deterioration is progressing at a rapid rate or where water conservation and control are serious problems. Classification of these lands according to their capabilities is essential in order to determine (1) the land which can be farmed safely with varying degrees of conservation treatment, (2) land which can be farmed only occasionally, and (3) land which should have a permanent grass cover. Soil surveys furnish the basic data for this classification.

Plan of Work: The increase would be used to employ additional soil surveyors to accelerate the present rate of surveys. Additional technicians would also be employed to provide on-site technical assistance to farmers and ranchers of the areas in rapidly establishing conservation and water control measures on the land and in revegetating those areas not suited for farming. The additional technicians would augment already existing but inadequate staffs and would enable needed acceleration of the present rate of application of land treatment measures.

(d) An increase of \$208,355 to accelerate map compilation and preparation and publication of soil maps and survey reports.

Need for Increase: The conversion of conservation surveys to standard soil surveys is progressing at a rapid rate. It is expected that as personnel become more familiar and experienced with this work the rate of conversion will increase still faster. It is important that survey reports and related soils maps be prepared and published as rapidly as possible to make the soil information available to Service technicians and to other Federal and State agencies and the general public, for watershed and land-use planning and other purposes. During the 1955 fiscal year, 22 soil survey reports were prepared and sent to the Government Printing Office for reproduction. At the end of the fiscal year, reports for an additional 109 soil surveys were in varying stages of preparation. It is estimated that field work on 15 more soil surveys

will be finished during the 1956 fiscal year and that 50 of the 124 survey reports in process will be sent to the printers during the same period. During the 1957 fiscal year it is anticipated that field work will be completed on an additional 25 survey areas. The present backlog of unpublished soil surveys and the rate at which additional surveys are planned to be completed will enable the Service to maintain a schedule of publishing about 50 soil survey reports annually.

Plan of Work: The increase would be used to employ additional personnel to compile maps, write and edit reports and prepare them for publication. The additional employees would augment the present staff engaged in this work.

(e) A decrease of \$84,365 due to providing a direct appropriation to the General Services Administration for certain leasing costs previously paid from this appropriation. Certain space assignment and leasing functions of the various Federal agencies were transferred to the General Services Administration under Section 1 of Reorganization Plan No. 18 of 1950. These functions are applicable only to general purpose space that may be occupied in any of 128 metropolitan areas, and include the acquiring and payment for space in buildings, the assignment and reassignment of such space, and the operation, maintenance, and custody thereof. The decrease of \$84,365 represents the cost of leasing functions which will be assumed by GSA in 1957.

STATUS OF PROGRAM

ASSISTANCE TO SOIL CONSERVATION DISTRICTS AND OTHER COOPERATORS

Current Activities:

The planning and establishment of soil and water conservation measures on farm and ranch lands is generally carried on in cooperation with soil conservation districts. These conservation districts are local units of Government, organized under State laws and responsible to the land-owners and operators in the districts and to the State legislatures. They are founded upon the sound principle of local initiative, direction, and control and are formed only in response to the petition and favorable referendum vote of the land-owners and operators who are carrying on agricultural operations within the proposed district boundaries. Conservation districts, numbering 2,674 on June 30, 1955, have been organized in all 48 States, Hawaii, Alaska, Puerto Rico, and the Virgin Islands.

The following types of assistance are being furnished to conservation districts in carrying out locally-adapted programs of soil and water conservation:

1. The services of soil scientists who make the necessary physical inventories of the land to secure data (soil type, degree of slope, character and extent of erosion, present land use, etc.) needed to determine the use capabilities and conservation needs of each acre of land. These soil surveys are conducted cooperatively with the land grant colleges and other designated State agencies and the survey reports and related soil maps are eventually published for the use of the Service, other Federal and State agencies and the public, in the development of land-use programs and for other purposes.
2. The services of soil conservationists, engineers, and other agricultural specialists and aides who help farmers and ranchers develop and apply individual conservation farm or ranch plans. The soil and water conservation practices included in such conservation plans allow for the best possible use of the farmer's land, labor, equipment, and financial ability to do conservation farming on his land.
3. The loan of special equipment needed to facilitate establishment of conservation practices but which is of a kind that is beyond the purchase ability of an individual operator or for other reasons is not readily available to the farmers and ranchers within the conservation district.

4. Technical assistance in watershed planning and other group enterprises, comprising consultation and advice on water and sediment problems, the development of work plans and supervision over construction, for the purpose of retarding runoff, stabilization of roadside waterways, reduction of sediment damage to agricultural lands, reservoirs, industrial property, and roads and bridges; and the drainage or irrigation of valuable agricultural lands.
5. In the western States, streamflow forecasts - developed from snow surveys - which serve as a basis for efficient seasonal utilization of water available for irrigation and other purposes.
6. The operation of a limited number of nurseries for observational purposes and field-scale trials of promising conservation plant materials to determine their suitability for erosion control purposes, and cooperation with non-Federal agencies in the propagation and utilization of new and uncommon strains of vegetative planting materials to promote adequate domestic production and distribution for conservation purposes.

In cooperation with other Federal and State agencies, some assistance is also given to other farmers and ranchers outside conservation districts. This assistance develops a better understanding locally of erosion and land-use problems, encourages more widespread adoption of conservation farming methods, and assures technical soundness of the practices applied.

In addition, the Service provides technical assistance to Agricultural Conservation Program participants in the planning, lay-out, and establishment of permanent-type conservation practices, both within and outside soil conservation districts. Part of the cost of this work is paid from funds advanced from the appropriation for that program.

Examples of Recent Progress:

New Conservation Districts Organized

As of June 30, 1955 farmers and ranchers in the 48 States and territorial possessions, all of which have enacted soil conservation district legislation, had organized a total of 2,674 conservation districts embracing an area of 1,484,974,221 acres. This represents an increase of 56 districts and 22,481,380 acres during the 1955 fiscal year. Additions to existing districts during the year numbered 144 and contained 20,997,158 acres. The 4,884,470 farms now in districts is about 90 percent of the total farms in the nation. In 16 States and 2 territorial possessions all farms are within the boundaries of districts. The operators of these farms are all eligible to become

cooperators with the districts. They also represent the potential work load for technical assistance with conservation work. It is anticipated that there will be approximately 66 new districts organized in 1956 and 40 in 1957 which will bring the total to 2,780 with about 93 percent of the nation's farms within district boundaries. The following table shows information about the 2,674 conservation districts which were organized and issued a certificate of organization by July 1, 1955:

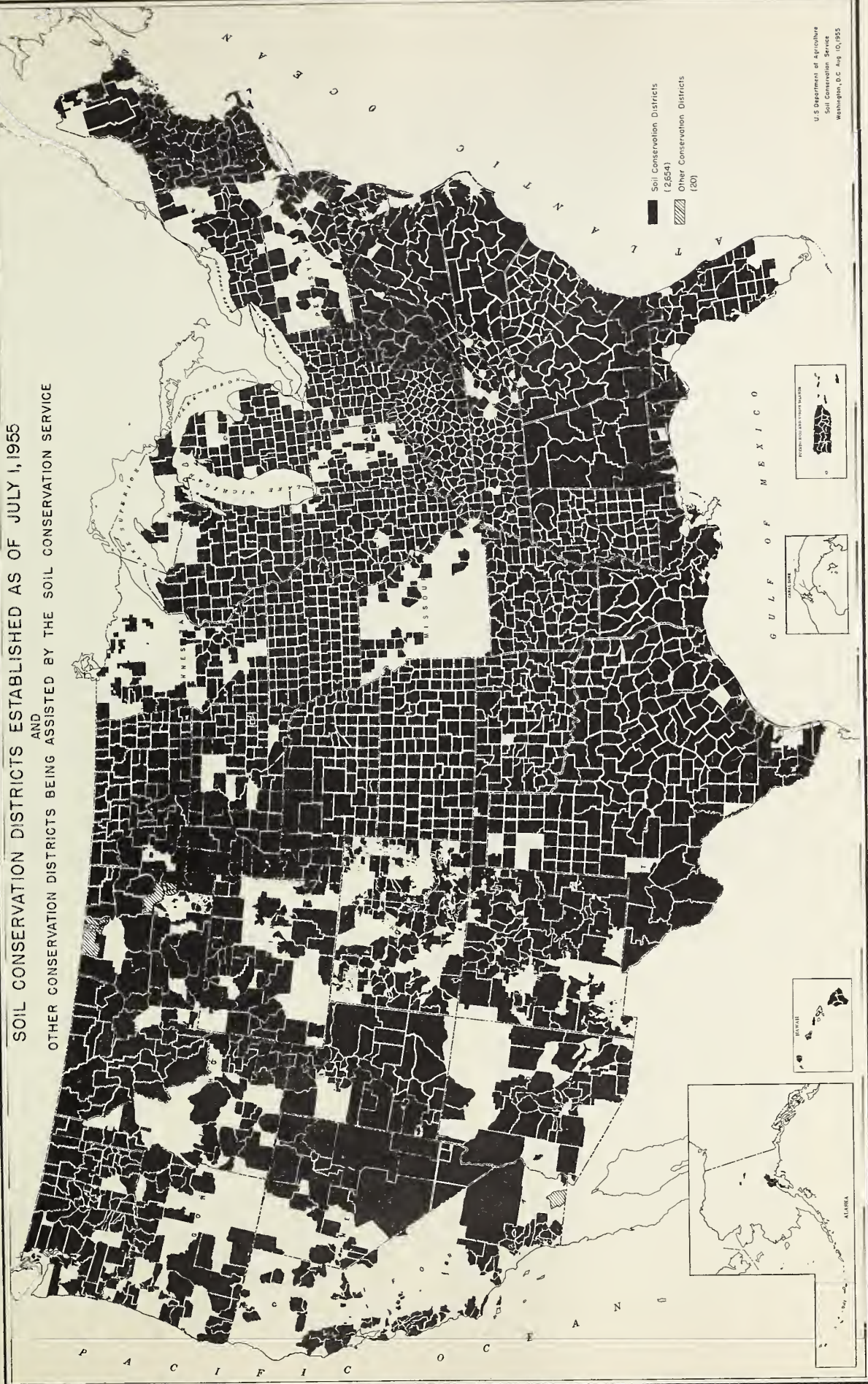
Kind of District	: Location	: Number of Dis-	: Approximate Area (Acres)	: Number of Farms
Soil Conservation Districts	: 48 States	: 2,602	: 1,460,445,104	: 4,801,304
Soil Conservation Districts	: Caribbean Area	: 19	: 2,269,711	: 54,270
Soil Conservation Districts	: Hawaii	: 15	: 3,317,180	: 5,052
Wind Erosion Districts	: Texas	: 1	: 964,480	: 721
Sub-districts	: Alaska	: 9	: 4,391,000	: 924
Work Area (called districts) ^{1/}	: Conn.	: 8	: 3,135,360	: 15,615
Grass Conservation Districts	: Mont.	: 19	: 6,566,396	: 1,746
Imperial Irrigation District	: Calif.	: 1	: 884,990	: 4,838
Total Cons. Districts:		: 2,674	: 1,484,974,221	: 4,884,470

^{1/} In Connecticut the comparable organizational unit is called "Work Area".

The attached map shows the Conservation districts which had been organized as of July 1, 1955.



SOIL CONSERVATION DISTRICTS ESTABLISHED AS OF JULY 1, 1955
AND
OTHER CONSERVATION DISTRICTS BEING ASSISTED BY THE SOIL CONSERVATION SERVICE



U.S. Department of Agriculture
Soil Conservation Service
Washington, D.C. Aug. 10, 1955

Number of Farms and Acreage in Conservation Districts

Date	: Number of : Districts : : Organized :	: Total Acres : in Organized : Districts :	: Approximate : Acres : in Farms :	: Number of : Farms in : Districts :
<u>Actual</u>	:	:	:	:
June 30, 1954	: 2,618	: 1,441,495,683	: 952,622,382	: 4,802,627
Average per district:	:	: 550,610	: 363,874	: 1,834
June 30, 1955	: 2,674	: 1,484,974,221	: 974,945,000	: 4,884,470
Average per district:	:	: 555,338	: 364,602	: 1,827
<u>Estimated</u>	:	:	:	:
June 30, 1956	: 2,740	: 1,524,000,000	: 1,000,000,000	: 4,968,000
Average per district:	:	: 556,204	: 364,964	: 1,813
June 30, 1957	: 2,780	: 1,554,000,000	: 1,020,000,000	: 5,024,000
Average per district:	:	: 558,993	: 366,906	: 1,807

Information Furnished Groups Sponsoring
Soil and Water Conservation

Because of its importance to the general welfare, groups such as industrial, civic, and youth organizations, labor unions, educators, ministers, and others are actively engaged in informational programs of various types designed to stimulate activity in soil and water conservation work. Many of these groups look to the Soil Conservation Service for factual information and guidance for whatever information program they sponsor. The Service cooperates to the extent resources and facilities permit. A considerable portion of the informational activities of the Service is directed toward helping these groups promote soil and water conservation programs at the community, State, or national level.

As a result of the demands and also the need for assistance on informational techniques required by the States for use in assisting Soil Conservation Districts, the Service assigned field information specialists in the 1955 fiscal year to six field locations. Two information specialists are stationed at each location and each serves about eight States. These field men, with the assistance of the information specialists in the Washington Office, devote full time to working with the States and soil conservation districts and with many kinds and types of local groups and organizations to further the national soil and water conservation program.

The Service actively encourages the participation of the County Extension Agent in helping soil conservation districts conduct their information and educational work. Work unit conservationists and their assistants work as closely as possible with extension personnel in developing radio programs and press releases,

and in scheduling and conducting field demonstrations designed to show groups of farmers how to do such phases of conservation work as do not require on-site technical help. Cooperation of this kind is steadily improving in most States.

Irrigation and Water Conservation Practices Accelerated

The recent drought years have greatly increased the demand for assistance in irrigation work in almost all States including the 31 eastern States where only a few years ago irrigation was extremely limited. The extension of the Water Facilities Act to these 31 States created a further demand for technical assistance for the development of irrigation water supplies and installation of irrigation systems.

Technical information on irrigation in the humid area formerly was limited. The Service prepared "Irrigation Guides" for the use of technicians assisting farmers with irrigation problems in these areas which give the standards for design and operation of irrigation systems under humid conditions. These guides are also available to private engineers, sprinkler equipment dealers, and others interested in irrigation development.

During the fiscal year 1955 technical assistance was given to farmers to install more than 3600 irrigation systems in the 31 eastern States. There continues to be a great demand for this type of service. As an example, an area conservationist in South Carolina reported that in May 1955 in one area alone 539,300 cubic yards of earth were moved in constructing 121 irrigation ponds.

In many irrigated areas of the West water shortages have impressed upon land owners and distributors of irrigation water the need for efficient irrigation systems and proper irrigation water management on the farms. With the assistance of Service technicians, irrigation companies usually plan to make improvements to the main system over a period of years. A typical example of this type of operation is the St. George Valley Irrigation Company in Utah. The company has taken action designed to conserve scarce irrigation water. It has installed over a mile of steel pipe syphon in its canal and lined nearly 21,000 feet of canal with concrete. It plans to line an additional 7,300 feet in 1956 and 1957. The Service assisted irrigation organizations with 693 similar water conservation improvements to their distribution systems in 1955.

To further conserve irrigation water the Service furnished technical assistance to landowners during 1955 to level 493,907 acres of land, and to develop improved methods of irrigation water application on over 1,700,000 acres.

Farm and Ranch Conservation Planning System Favorably Received

The progressive planning system adopted by the Service in 1951 has become well established throughout the Service. It enables Service technicians to assist farmers and ranchers with conservation work whenever they are ready to carry it out, with assurance that such work will conform with the needs and capabilities of the land and that it will fit into the plan for the whole unit when it is ultimately completed. This method of providing planning assistance has

proved to be more acceptable to farmers and ranchers. It is flexible and readily permits changing the plan to meet changing conditions. Cooperators have ample time to consider their decisions before making them. As a result the planned conservation is applied to the land more rapidly and effectively. This promotes efficiency in the use of technical time.

Each basic conservation plan that Service technicians help prepare contains a soil map or, in areas of rangeland and woodland, a range or woodland site map. These maps show accurately the kinds of soils in the operating unit, and their use capabilities. In addition, each conservation plan folder contains a conservation plan map of the unit showing field arrangement, field acreages, the planned land use, and some of the major features of the conservation plan. Each map is accompanied by an appropriate legend explaining the features shown on it. Narrative material included in the conservation plan describes each soil or site found on the farm or ranch and gives the cooperator sufficiently detailed instructions to enable him to carry out the plan with a minimum of technical assistance.

Forage Production Increased Through Brush Control

The invasion of the extensive grasslands of the plains of Southwestern Texas by dense stands of mesquite and other undesirable brush species has drastically reduced forage production for livestock in this important range livestock area.

During the past few years, however, a phenomenal change has taken place. Large acreages are being converted from brush back to grassland. An ever increasing number of ranchers, working with their soil conservation districts and cooperating agencies, have found that brush control, coupled with sound range management practices, provides a practical and profitable means of restoring high forage production levels. In 1954 alone, 602,531 acres within soil conservation districts in this area were cleared of brush.

A number of methods are being used. Hand grubbing has been supplanted by such mechanical methods as chaining, the use of brush cutters, and root plowing, or the use of chemicals. Chaining operations require two large crawler-type tractors that break down and pull out the brush by means of heavy ship anchor chains. Root plowing cuts the brush roots off at a depth of 12 to 18 inches with heavy plow-type blades. Giant brush cutters are used for some of the large shrubs and smaller type cutters or mowers for small brush and sprouts. Chemicals being used include both 2,4-D and 2,4,5-T.

Cost of initial treatment varies from \$2.00 to \$15.00 per acre depending upon the method used and the density and size of the brush stands. Because of the cost involved, the variable potentials for successful brush control, and the need for accompanying management, ranchers have found it highly important to obtain sound technical assistance so as to fit this practice into their soil conservation district plans.

In many cases the remnant of the original grass species remaining in the brush stands is adequate to assure a relatively rapid range recovery following clearing operations if the area is deferred from grazing use for a two-year period and properly managed thereafter. If the grass remnant is inadequate, the area is seeded to adapted species at the time of clearing.

The increased production resulting from brush control is indicated by the fact that untreated brush ranges commonly require from 25 to 40 acres to support a cow for one year while successfully treated and managed ranges support a cow on 10 to 15 acres. The remarkable increase in the acreage cleared of undesirable brush in recent years attests to its feasibility and the profit to the rancher which may be expected from this conservation practice.

Snow Surveys and Water Supply Forecasting Data Reduced Impact of Drought

There are now more than 1,200 snow courses in the Western States network, including those in British Columbia, Canada. In the fiscal year 1955 some 950 snow surveyors (most of them only employed a few days each year) traveled a total of 49,000 miles by foot, over-snow machines, or aircraft, and made 54,000 individual snow measurements. Seasonal streamflow forecasts were made on all major streams of the West and many of the minor streams which are major sources of irrigation water for farmers and ranchers in soil conservation districts. Forecasts were made for 336 stations and nearly 25,000 copies of the forecasts were provided to the water users in more than 400 local districts.

These measurements of snow pack showed that prospective water supplies for the Western United States in 1955 varied from ample supplies and possible floods on the northern section of the Columbia Basin to an extreme and severe water shortage on the Rio Grande in Colorado and New Mexico. The water shortage on the Rio Grande was forecast to be particularly critical with a combination of short snow pack and lack of water stored in reservoirs. This situation developed in part as a climax of a series of years of deficient runoff. This picture of low prospective runoff was forecast to extend to central Colorado, parts of California, Utah, Nevada, extreme southern Idaho, southeastern Oregon, southeastern Wyoming, and Arizona. The snow survey information enabled farmers, water-users associations, irrigation districts, municipalities, power companies, loan agencies, and others in the affected areas to take effective steps to lessen the impact of the water shortage on their economy.

In Colorado, farmers drastically reduced their acreage of heavy water-using and high-investment crops, such as sugar beets and increased crops using less water.

Farmers along the Sevier River in Utah, where the most severe water shortage in that state is expected in the 1955 crop season, have cut their acreage of sugar beets and are either planting early maturing crops or are leveling their land and letting it lie in fallow this year. They are also adopting more efficient water application practices. The canal companies delayed turning water into the canals from the reservoir for irrigation until absolutely necessary, which was several weeks later than usual. As soon as the need for water declined, they stopped releasing water from the reservoir to the canals, a practice which they had not followed before.

Another excellent example of the positive benefits made possible in 1955 to farmers in soil conservation districts through the snow survey information is reported from Salmon Falls, Idaho. In this area of the Twin Falls Soil Conservation District there are about 70,000 acres which could be irrigated if adequate water were available. However, the available supply fluctuates markedly from year to year. The acreage actually irrigated varies from 10,000 acres or less to over 30,000 acres, depending on the watershed yield. Without dependable water supply forecast data, the farm operator lacks information to guide him in the amount and type of crops to plant. Heavy snows fell in the foothills in 1955. March precipitation was 183% of normal. Visual evidence of snow covered hills seemed to indicate a good water supply, probably adequate for irrigation of about 25,000 acres of land. Lacking the Service's water supply forecasts the farm operators would have prepared, pre-irrigated, and seeded the usual acreage devoted to cultivated crops. However, the SCS water supply forecast based on snow surveys high in the mountains indicated runoff only about 60% of normal. Accordingly, the farm operators reduced their anticipated irrigated acreage by about one-half. In addition, the types and percentages of the various crops planted were different than those which are usually planted under a normal water supply. Alfalfa, pasture, and crops, requiring a late season water supply were materially reduced or not planted at all, thus saving farmers both time and money.

Woodland Conservation Increase

Improvements in wood utilization have increased the opportunities for many of the 4 1/4 million woodland owners to get greater immediate returns from trees now growing on their woodland. This has also served to emphasize the economic importance of wood crops and caused many landowners to place much more importance to their woodland. The Service has made much progress in the development of minimum technical standards in woodland conservation to be used by farm planners in working with landowners. The past year has seen a great increase in the quantity of woodland conservation practices, including tree planting, applied by private landowners in soil conservation districts. This trend appears to be on the increase in view of the demands for Service technical assistance by landowners. Tree planting is an example of a single practice which indicates this upward trend. Last year landowners in soil conservation districts planted more trees than they had planted any other year. They planted almost half of all the trees planted on privately-owned land in 1954. The timber, pulp and paper industries, bankers, and others, have contributed toward this job. A large number of planting machines are now available to landowners in soil conservation districts.

Value of Windbreaks

A field windbreak conservation and economic survey was completed this year on sample areas in the Great Plains. Area studies were made by the Service in South Dakota and Oklahoma in cooperation with the State Colleges. Results of these field observations will be available at an early date for use by field technicians. Preliminary analyses of these data seem to indicate these major significant facts for the northern Great Plains area:

1. Windbreaks Reduce Soil Blowing - Windbreaks established at right angles to the prevailing winds very significantly reduce wind velocities and help to prevent soil movement in an area 20 to 30 times the height of the trees on the leeward side of the planting and several times the height of the trees on the windward side of the planting. Landowners who have had windbreaks planted for a number of years are enthusiastic in their praise of this very effective means of reducing soil blowing on the sheltered areas.
2. Windbreaks Increase Income - Well established windbreaks, properly designed and correctly located, will increase the landowner's income from many of the annual crops adapted to that area. This may be a result of one or more of the following: reduction in wind velocities and soil movement, better moisture utilization, insurance of better seedling establishment, and reduction of crop cultivation.
3. Properly Established Windbreaks Increase the Value of the Farm - Even though landowners may not be able to assess the correct monetary benefits derived from windbreaks, they are conscious of the values windbreaks contribute to the farm. This is reflected in prices asked for and paid for farms with good windbreaks.

Standardization of Soil Surveys Initiated

The combining of all soil survey activities of the Department under the administration of the Soil Conservation Service in the fiscal year 1953 made adjustments necessary in soil survey procedures to make certain that the needs of all soil survey users were met in one survey. In the spring of 1954 policies and procedures were developed with the State agencies which are cooperating in the National Cooperative Soil Survey. Standards were established for describing soil mapping units in the national classification scheme, preparation of descriptive legends, field reviews, and appropriate work plans with the cooperating State agencies.

Progress was made in the 1955 fiscal year in essentially every survey area toward this standardization. Mapping unit descriptions are being prepared in all cases and a start has been made on the descriptive legends. All new survey areas this past year were started as standard soil surveys and work plans have been signed in 149 soil conservation districts to convert the former type surveys to standard soil surveys.

Soils Analyses Improves Mapping

During the past fiscal year laboratory analyses were made of 2,500 soil samples from 32 States and one territory. Primary attention was given to the characterization of soils from which guides could be developed to increase uniformity of mapping by soil surveyors in the field, and to characterize those physical properties of the various soils that primarily determine their capabilities and management requirements. Analysis work was also performed on several mineral element nutrient deficiencies in relation

to soil types. As an example, the recognition of amorphous materials as an importation constituent of some soils occurring in Oregon and Washington, and its relationship to volcanic ash as a parent material, has contributed greatly to the understanding of the low productivity and phosphate requirements of the soils in this area.

Less Costly Publication of Soil Survey Reports Planned

Early in the year a sample set of soils maps, on photo mosaic base, was prepared and distributed to field personnel and cooperating agencies for comment on adopting this type of map for publication rather than the colored maps on a planimetric base as had been the practice in the past. As a result of the favorable response, it is planned that most soil maps will hereafter be reproduced on a mosaic base, except in those cases where photography suitable for a mosaic is not available. This method of map preparation and printing can be done at a much lower cost than the colored maps on planimetric base.

During the 1955 fiscal year 14 soil survey reports consisting of maps and texts were published. These were for Sulphur Spring Valley Area, Arizona; Sacramento Area, California; Cass and Newton Counties, Indiana; McLeod County, Minnesota; Blaine County, Nebraska; Avery and Buncombe Counties, North Carolina; Huron County, Ohio; Cleveland County, Oklahoma; Cocke and Decatur Counties, Tennessee; Bland County, Virginia; and Lewis County, Washington. This brings to 1,652 the total number of soil surveys published to date.

At the end of the fiscal year there were 22 soil survey maps and reports in the Government Printing Office for printing. Field Surveys had been completed and correlation work finished on 50 additional areas for which preparation of the reports and maps was in progress. Sixty-two other field surveys had been completed and work was in progress on correlations and report writing.

Data Developed on Soil-site Correlation for Woodland Areas

In planning conservation programs with landowners, there is a need for basic information relating the potential growth of trees to the soils on which they grow or should grow. These data would have application on about 300 million acres of land in private ownership in soil conservation districts best suited to growing wood crops. During the past year the Service has made considerable progress in perfecting the field techniques and training technicians in the conduct of field surveys needed to establish the correlations between significant soil groupings and site indices. These interpretations are being utilized in the development of specifications for the kind of woodland work that landowners can be trained to do for themselves. These data are particularly useful to the soil scientist in determining mapping units which will reflect significant soil characteristics for tree growth. They are recognized as essential for more complete interpretations of soil surveys, and will be of particular significance in published soil survey reports. Soil-site index

correlations are being projected into new areas as rapidly as facilities permit. They have been established for the west coast for Douglas fir in Washington and Oregon, for ponderosa pine in the Cascades of Washington and Oregon, for lodgepole pine in eastern Oregon, and for southern pine in Georgia, Louisiana, and parts of east Texas. The northern hardwoods in Vermont and the hardwood in northern Michigan are being studied this year. Once the necessary correlations are identified, it becomes possible to predict, for any given kind of soil what specific species of trees will do on those soils, the rate at which they will grow, how much timber they will produce in a given number of years etc. This prediction can be made regardless of whether trees are presently occupying such sites or not. These soil-site index correlations need to be established for all soils and trees in forest climax zones of all states and for those areas outside forest climax zones into which tree planting is being extended. This is especially desirable in the Great Plains, both northern and southern, where windbreak plantings are a significant part of a total conservation program.

Soil Mechanics Work Accelerated

During the fiscal year the Soil Mechanics Laboratory at Albuquerque, New Mexico, analyzed, tested and prepared reports on soil samples taken from 470 sites selected for earth-fill structures in 31 states. These reports furnished information on the (1) safe slopes that could be used on the earth-fill dam, (2) the amount of water needed to get optimum compaction of the earth in the fill as well as the amount of compactive effort needed, (3) the suitability of the foundation materials, (4) the depth required of the cut-off trench, (5) the amount of water expected to be lost through seepage, (6) the line of saturation which would eventually develop in the dam, (7) the need for drainage, and (8) the amount and rapidity of settlement of the fill material that could be expected. These data are essential to field engineers in the development of designs and specifications for earth-fill structures and in determining the suitability of proposed construction sites. The demands for analysis of soil samples for this purpose has increased greatly in the past two years in view of the amount of structural works of improvement being installed in Flood Prevention and Watershed Protection projects. The laboratory serves all programs of the Service with work performed for other than the Conservation Operations program being handled on a reimbursable basis.

Survey and Planning Accomplishments

The following tables show the major accomplishments of the Service in assisting soil conservation districts and other cooperators in the fields of surveys and planning. The two major types of surveys conducted by the Service are defined as follows:

- (1) Soil surveys are those where soil types, slope gradients, and erosion conditions and their boundaries are determined in detail by actual field examination and where classification is in accordance with the standard nation-wide system of soil classification, to furnish information for conservation planning, land inventories, publication, and other purposes.

(2) Range surveys are those of range sites and physical conditions used in ranch or watershed planning on grazing land.

Some reconnaissance surveys, where soil types are determined by observations with only random tests, are also made to provide data on soils for delineation of problem areas and for broad program planning.

SURVEYS:

Type of Survey	Unit	1955 Actual	Total as of 6/30/55	1956 Estimate	1957 Estimate
Soil surveys	Acres	31,385,140	476,447,399	31,500,000	40,000,000
Range	Acres	10,161,071	43,612,034	12,000,000	15,000,000

CONSERVATION PLANNING OF INDIVIDUAL FARMS AND RANCHES:

Explanation	Active District Cooperators Number	Acres	Net increase in SCD cooperators and basic plans
	As of June 30, 1954		Fiscal Year 1954
No. soil conservation district cooperators	1,454,287	423,690,086	157,318
SCD cooperators having basic plans	974,463	268,351,553	22,528
No. basic plans fully applied	162,336	34,571,990	6,272
	As of June 30, 1955		Fiscal Year 1955
No. soil conservation district cooperators	1,552,336	454,427,099	98,049
SCD cooperators having basic plans	1,034,530	286,515,597	60,067
No. basic plans fully applied	164,673	33,008,585	2,337
	As of June 30, 1956 (Est.)		Fiscal Year 1956 (Est.)
No. soil conservation district cooperators	1,640,000	475,000,000	87,664
SCD cooperators having basic plans	1,084,000	300,000,000	49,470
No. basic plans fully applied	180,000	36,000,000	15,327
	As of June 30, 1957 (Est.)		Fiscal Year 1957 (Est.)
No. soil conservation district cooperators	1,740,000	500,000,000	100,000
SCD cooperators having basic plans	1,150,000	322,000,000	66,000
No. basic plans fully applied	200,000	40,000,000	20,000

TECHNICAL ASSISTANCE ON GROUP JOBS:

Item	: 1955 : Actual	: Total as of : 6/30/55	: 1956 : Estimate	: 1957 : Estimate
Watershed Work Plans	:	:	:	:
Number	: 106	: 262	: 100	: 120
Acres	: 4,797,004	: 8,314,149	: 4,525,000	: 5,430,000
Group Drainage Jobs	:	:	:	:
Number	: 1,856	: 10,923	: 1,600	: 1,500
Acres	: 2,275,258	: 7,894,138	: 1,960,000	: 1,840,000
Group Irrigation Jobs	:	:	:	:
Number	: 693	: 1,719	: 700	: 800
Acres	: 1,301,772	: 2,307,767	: 1,315,000	: 1,465,000

Application of Practices

The following tables show some of the major conservation practices that were applied with technical assistance furnished by the Soil Conservation Service:

a. Major practices applied on farms and ranches of soil conservation district cooperators

Type of Practices	: Unit	: 1955 : Actual	: 1956 : Estimate	: 1957 : Estimate
Contour farming	: Acres	: 2,949,666	: 3,000,000	: 3,200,000
Cover cropping	: Acres	: 4,295,686	: 4,300,000	: 4,500,000
Strip cropping	: Acres	: 806,964	: 800,000	: 800,000
Seeding pasture and range	: Acres	: 2,944,625	: 3,000,000	: 3,000,000
Tree planting	: Acres	: 287,716	: 300,000	: 320,000
Farm and ranch ponds	: Number	: 73,348	: 75,000	: 78,000
Terraces	: Miles	: 42,316	: 41,000	: 40,000
Diversion channels	: Miles	: 6,493	: 6,500	: 7,000
Farm drainage	: Acres	: 1,318,972	: 1,250,000	: 1,200,000
Improved water application ...	: Acres	: 1,655,536	: 1,500,000	: 1,500,000
Land leveling	: Acres	: 446,003	: 450,000	: 480,000
Field windbreaks	: Miles	: 1,182	: 1,500	: 1,800
Land Clearing	: Acres	: 605,947	: 600,000	: 600,000

b. Major practices applied on farms of non-district
Agricultural Conservation Program Participants

Type of Practices	Unit	1955 Actual	1956 Estimate	1957 Estimate
Terraces	Miles	3,490	3,000	2,800
Diversions	Miles	409	450	500
Waterway development	Acres	7,565	7,300	7,000
Contour strip cropping	Acres	140,647	125,000	110,000
Contour farming	Acres	197,223	180,000	160,000
Grazing land management	Acres	1,203,608	1,200,000	1,200,000
Stock water dams and ponds ..	Number	13,226	12,500	12,000
Reorganization of farm irrig. systems	Acres	20,537	20,000	20,000
Land leveling	Acres	47,904	50,000	50,000
Irrigation reservoirs	Number	468	450	400
Improved water application ..	Acres	58,082	55,000	50,000
Farm drainage	Acres	234,590	200,000	180,000
Land clearing	Acres	28,010	25,000	20,000

NOTE: Approximately 33 percent of the cost of assisting Agricultural Conservation Program participants (whether districts cooperators or not) in 1955 was financed with "Conservation Operations" funds and 67 percent with funds advanced from the item "Agricultural Conservation Program" under the 5th transfer proviso contained in the annual appropriation Act.

c. Major practices applied on group jobs

Type of Practice	Unit	1955 Actual	1956 Estimate	1957 Estimate
Ditch and canal excavation .(	Miles	88	85	85
	(Cu.Yds.	394,144	380,000	380,000
Channel improvement	Lin.Ft.	230,926	223,000	223,000

Basic Conservation Planning In
Soil Conservation Districts as of December 31, 1954

As of December 31, 1954 the Soil Conservation Service was cooperating with 2,650 Soil Conservation Districts comprising 1,461,025,000 acres of land in the 48 States and in Hawaii, Alaska, and the Carribean area. The following table by State, Territory, and possession shows the percentage relationship of the number of operating units and agricultural land for which basic plans have been prepared by the Service to the total area requiring basic conservation plans.

Basic Conservation Planning in Soil Conservation Districts
By States and Nationally, December 31, 1954

States	Total SCD's as of 12/31/54	Agricultural Land in SCD's	Operating Units/ in SCD's	Basic Conservation Plans Prepared as of 12/31/54		% of Operating Units Planned	% of Agric. Land Planned ^{1/}
	Number	Acres	Number	Number	Acres	%	%
Northeast							
Connecticut	8	1,272,352	15,615	2,333	255,699	14.9	20.1
Delaware	3	998,270	7,679	1,078	177,945	14.0	17.8
Maine	15	4,000,316	20,000	4,405	885,630	22.0	22.1
Maryland	23	5,635,106	35,706	9,812	1,402,958	27.5	24.9
Massachusetts	15	1,898,918	22,882	4,143	476,608	18.1	25.1
New Hampshire	10	5,563,345	18,767	2,965	521,620	15.8	9.4
New Jersey	12	2,128,287	26,728	4,313	490,526	16.1	23.0
New York	40	12,541,153	94,771	19,719	2,589,785	20.8	20.7
Pennsylvania	30	7,872,526	74,414	13,058	1,498,841	17.5	19.0
Rhode Island	3	191,052	2,635	791	96,342	30.0	50.4
Vermont	13	3,527,381	19,093	5,150	1,018,970	27.0	28.9
Virginia	27	15,240,613	132,370	28,261	4,779,234	21.4	31.4
West Virginia	14	8,171,216	71,239	22,577	2,937,782	31.7	36.0
Total	213	69,040,535	541,899	118,605	17,131,940	21.9	24.8
Southeast							
Alabama	12	20,852,784	147,931	46,793	8,050,628	31.6	38.6
Arkansas	73	28,794,617	145,677	39,270	7,910,422	27.0	27.5
Florida	57	16,401,850	47,748	16,530	5,671,781	34.6	34.6
Georgia	27	28,378,240	167,718	69,556	13,189,701	41.5	46.5
Louisiana	26	25,963,690	113,519	20,751	4,256,762	18.3	16.4
Mississippi	74	20,935,501	145,853	49,951	8,819,219	34.2	42.1
North Carolina	36	20,472,292	280,788	59,103	6,113,881	21.0	29.9
South Carolina	44	17,774,707	112,898	30,718	5,243,329	27.2	29.5
Tennessee	79	16,092,267	155,579	22,852	3,088,040	14.7	19.2
Caribbean	19	2,131,596	52,737	9,699	620,610	18.4	29.1
Total	447	197,797,544	1,370,448	365,223	62,964,373	26.6	31.8
Cornbelt							
Illinois	97	30,086,704	222,820	27,615	4,700,804	12.4	15.6
Indiana	65	13,447,082	105,905	13,997	2,022,895	13.3	15.0
Iowa	100	34,264,229	192,059	33,613	6,057,185	17.5	17.7
Kentucky	122	20,530,837	200,006	35,220	4,364,750	17.6	21.3
Michigan	72	16,429,899	145,504	15,787	1,965,334	10.8	12.0
Minnesota	69	18,870,798	102,870	13,633	2,455,710	13.3	13.1
Missouri	32	8,879,120	57,157	6,361	1,195,669	11.1	13.5
Ohio	84	19,966,480	158,791	27,720	3,464,183	17.5	17.3
Wisconsin	67	22,931,092	166,653	19,433	3,074,052	11.7	13.4
Total	708	185,406,241	1,351,765	193,379	29,300,582	14.3	15.8
Great Plains							
Colorado	98	24,527,486	38,427	10,343	9,408,931	26.9	38.4
Kansas	105	50,557,976	131,843	49,572	15,220,545	37.6	30.1
Montana	78	50,801,841	33,058	8,274	16,120,203	25.0	31.7
Nebraska	87	47,941,751	108,266	34,184	11,048,061	31.6	23.0
New Mexico	60	40,433,258	26,195	9,313	20,628,598	35.6	51.0
North Dakota	79	39,670,174	65,026	19,694	11,663,222	30.3	29.4
Oklahoma	86	39,314,997	144,229	52,130	12,515,555	36.1	31.8
South Dakota	64	33,987,415	58,813	20,112	10,847,717	34.2	31.9
Texas	167	151,292,636	358,136	80,252	44,446,879	22.4	29.4
Wyoming	41	18,059,323	10,229	3,303	3,510,757	32.3	19.4
Total	865	496,586,857	974,222	287,177	155,410,468	29.5	31.3
West							
Arizona	46	4,283,784	8,617	3,238	759,237	37.6	17.7
California	105	19,364,481	72,268	15,428	2,982,094	21.3	15.4
Idaho	40	11,809,032	25,008	3,032	1,187,925	12.1	10.1
Nevada	31	6,261,752	2,707	1,131	771,429	41.8	12.3
Oregon	49	13,093,554	32,032	3,468	1,798,921	10.8	13.7
Utah	48	13,292,442	26,261	6,639	3,855,584	25.3	29.0
Washington	75	18,859,773	73,458	11,435	2,830,672	15.6	15.0
Alaska	9	1,799,842	1,054	220	28,031	20.9	15.6
Hawaii	14	2,269,589	3,456	154	99,292	4.5	4.4
Total	417	91,034,249	244,861	44,745	14,313,185	18.3	15.7
National Total	2,650	1,039,865,426	4,483,195	1,009,129	279,120,548	22.5	26.8

^{1/} Includes all private and public land on which the SCS is authorized to work - i.e., the cropland, grassland, woodland, wildlife, and other land used for agricultural purposes within the boundaries of soil conservation districts.

Prepared by
Operations Analysis & Records Section, SCS
August, 1955



Percentage of Agricultural Land Included in Basic
Conservation Plans

By December 31, 1954 the Service was providing technical and other assistance to 2,632 of the 2,650 Soil Conservation Districts organized as of that date. Eighteen districts formed during the latter part of the year had not as yet been staffed. The following table shows by States the number of active districts which had from 10 percent or less to more than 50 percent of the agricultural land in the Districts included in basic conservation farm or ranch plans.

Acreage of Basic Plans Related to Agricultural Land
as of December 31, 1954

States	Relation of Acreage in Basic Plans to Agricultural Land ^{1/}					Total SCD's Serviced in 1954 No. SCD's
	10% and Less	10.1 to 20%	20.1 to 35%	35.1 to 50%	More than 50%	
Northeast - Connecticut	1	1	5	1	-	8
- Delaware	1	-	2	-	-	3
- Maine	2	6	5	1	1	15
- Maryland	1	6	11	4	1	23
- Massachusetts	-	5	8	1	1	15
- New Hampshire	5	4	1	-	-	10
- New Jersey	1	3	4	3	1	12
- New York	7	14	15	4	-	40
- Pennsylvania	7	12	6	3	2	30
- Rhode Island	-	-	-	1	2	3
- Vermont	-	4	4	1	4	13
- Virginia	7	2	8	9	3	29
- West Virginia	-	2	6	3	3	14
Total	52	59	75	31	18	215
Southeast - Alabama	-	-	6	5	1	12
- Arkansas	11	12	25	17	6	71
- Florida	6	11	9	11	20	57
- Georgia	2	1	4	7	13	27
- Louisiana	6	13	5	2	-	26
- Mississippi	3	5	21	22	23	74
- North Carolina	11	5	7	12	1	36
- South Carolina	1	6	23	14	-	44
- Tennessee	42	2	13	10	8	75
- Caribbean	-	2	15	-	2	19
Total	82	57	128	100	74	441
Cornbelt - Illinois	26	49	18	4	-	97
* Indiana	32	12	17	3	1	65
- Iowa	25	38	34	2	1	100
* Kentucky	30	29	41	17	5	122
* Michigan	32	22	14	2	2	72
- Minnesota	24	12	11	6	11	64
- Missouri	11	15	5	-	-	31
- Ohio	15	41	28	-	-	84
- Wisconsin	40	12	13	2	-	67
Total	235	230	181	36	20	702
Great Plains- Colorado	18	9	22	19	30	98
- Kansas	11	17	44	21	12	105
- Montana	18	7	16	18	19	78
- Nebraska	6	24	39	11	7	87
- New Mexico	5	10	9	9	28	61
- North Dakota	6	15	25	21	12	79
- Oklahoma	3	17	33	23	10	86
- South Dakota	18	3	16	16	11	64
- Texas	24	43	49	32	18	166
- Wyoming	9	8	11	8	5	41
Total	118	153	264	178	152	865
West - Arizona	6	3	8	11	18	46
- California	46	14	21	11	12	104
- Idaho	25	10	3	1	-	39
- Nevada	12	8	4	3	3	30
- Oregon	27	7	3	5	4	46
- Utah	8	9	14	8	9	48
- Washington	41	6	12	6	9	74
- Alaska	8	1	-	-	-	9
- Hawaii	11	-	2	-	-	13
Total	184	58	67	45	55	409
Grand Total	651	557	715	390	319	2,632
Percentage	24.7%	21.2%	27.2%	14.8%	12.1%	

^{1/} Includes all public and private land on which the SCS is authorized to work - i. e., the cropland, grassland, woodland, wildlife and other land used for agricultural purposes within the boundaries of soil conservation districts.



Two Additional Nurseries Established

The newer, specialized plant materials that are needed in Service work on special problems in Soil Conservation Districts are produced and tested at twelve nursery locations. Two additional nursery units were established in the western part of the Great Plains this spring under cooperative arrangements with state Experiment Stations to enable further testing and the production of grass and legume seed for field testing in an area where the need is great and seed of species best suited to the area can not be procured on the market. Five nurseries are being operated by the SCS and seven under cooperative agreement with State institutions, mostly State experiment stations.

Final steps in the liquidation of production facilities at all nurseries were taken during the past fiscal year and all production is now confined to the selected strains, and the further production of the newer, promising accessions required for field testing.

Special Conservation Plant Materials Tested

There is a great reservoir of plants waiting to be explored and tested for uses on special conservation problems. Foreign accessions are obtained usually through the plant Introduction section of Agricultural Research Service. After observation at primary introduction centers the more promising ones are transferred to SCS or cooperating nurseries for further testing and increase. Some of these introductions have subsequently been found to be very useful in the Soil Conservation District Program. Among the more recent ones are: (1) selections of Bahia, carpet and finger grass on the lower fertility soils in the southeast, (2) a Korean red trailing raspberry for covering ditch banks and steep slopes in the northeast, (3) suitable hardy shrubs like autumn olive for wildlife use, and rapidly growing compact conifers for Christmas tree production in the cornbelt, and (4) cold hardy, vigorous legumes like yellow flowered alfalfa that can compete with dry land grasses like crested wheat grass, and withstand livestock grazing in the drier parts of the Great Plains. Selections of introduced lovegrasses are proving valuable in the arid southwest and bluegrass hybrids developed and distributed cooperatively with the Carnegie Institution of Washington prove valuable in the northwest and point to a new use that the native grasses can be put in the grass improvement work.

An even greater reservoir of plants exists in the native vegetation. Where this source of plant materials has been properly explored a great many species and strains have been found that are very useful in soil conservation. Among these are: a strain of black locust of good form and rapid growth that shows increased resistance to borer damage; locally adapted strains of switch grass for sandy lands and closely related species found in the salty marshes along the coast to improve tame pastures on many areas that are otherwise waste land; a variety of honey suckle that matures its fruit in the fall and persists into

winter to furnish fruit to upland birds when other feed may be buried in a deep layer of snow; a rust resistant cottonwood that survives better in field shelter belts; and a good many locally adapted hardy native legumes and grasses. These legumes and grasses will be valuable in a watershed protection program to provide permanent protection to land that must remain in grass. Greatest progress in the selection, domestication and proper use of native grasses and legumes has been made in the northwest. Here dozens of superior plants are in commercial production and marketing channels and thus are generally available for soil conservation use.

Two closely related problems that arise with the development of the newer species and strains are given prompt attention; these are methods of seed production and the developing of seeding, establishing, and other techniques that are necessary to bring these relatively unknown plants into quick successful use.

Some of the plants and the associated techniques employed in their successful utilization now prove valuable in some of the possessions. As an example of this it was recently reported that in Hawaii among numerous trials recently conducted it was found that three grasses from widely separated parts of the mainland were well suited to the varied rainfall and temperature conditions of the islands. These are budded grass from the Rio Grande country of southern Texas, Pengola grass from Florida, and Kikuyu grass, a spreading troublesome weed in orchards and gardens in southern California, but rated as a good forage grass in the tropics from whence it came. Similar progress could be cited for Puerto Rico and Alaska.

The final step in evaluating plant materials consists of testing them under field conditions. Twenty-three technicians, each assigned from one to several states, conduct these trials with farmers cooperating with Soil Conservation Districts. This is done on a project basis, cleared with the State Conservationist and put into operation with the help of the work unit conservationist. One of the twenty-three technicians, located in Florida, is paid entirely from State funds.

Status of Great Plains Wind Erosion Area

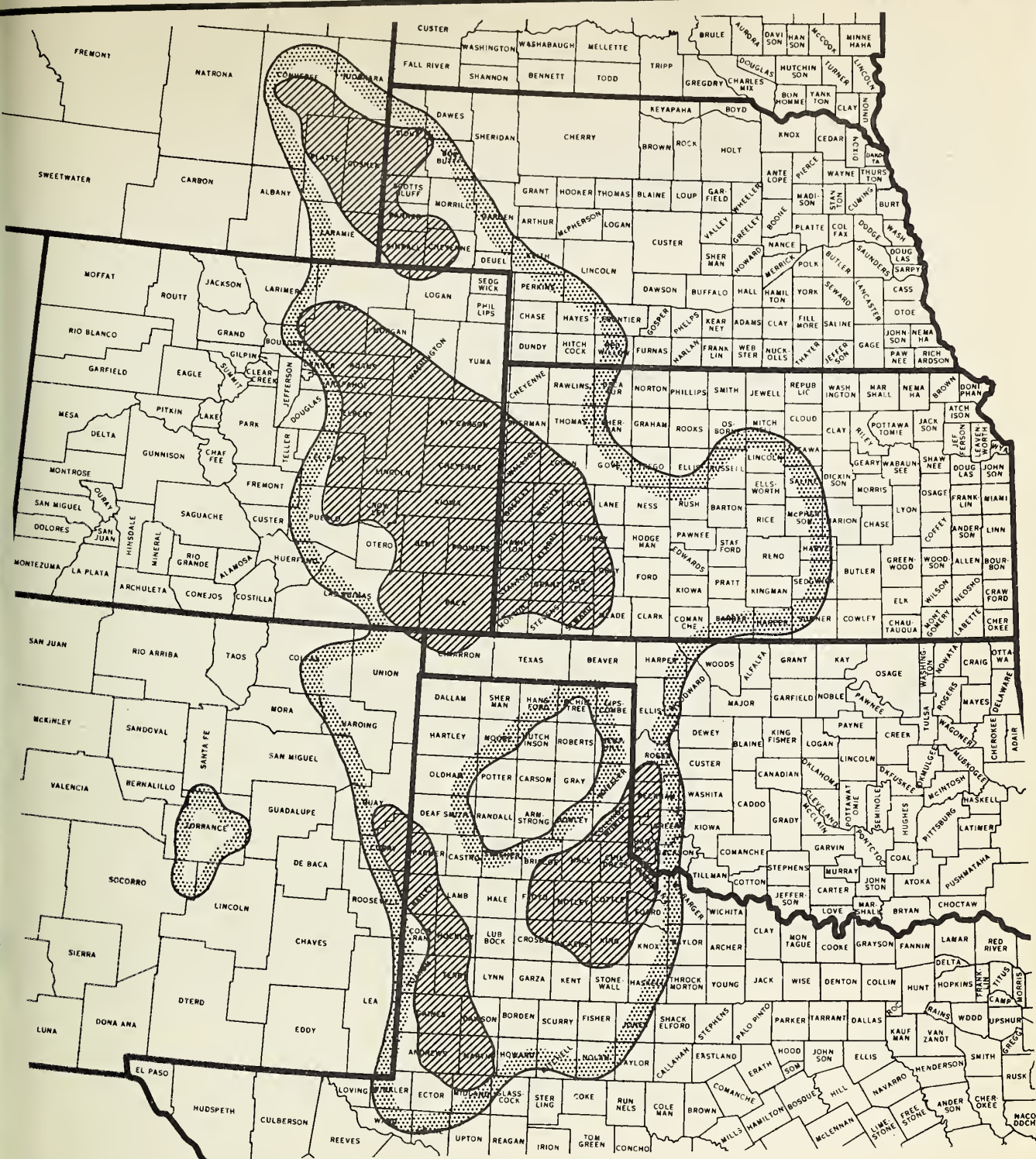
The widespread drought of 1954 continued into the winter months providing conditions for more land damage by wind erosion beginning in November. By February 1955, nearly 5 million acres of cropland seeded to wheat, much of which had never germinated, was blowing. Fortunately, there were no severe wind storms during the 1955 blow season because there were more acres in condition to blow than had been heretofore experienced. The actual acreage damaged was not quite as large in the 1955 season as in the previous year but the effect of previous land damage and continued drought made the situation more critical than had previously been experienced. The attached map and chart show estimates of acreage damaged and acres in condition to blow during the 1955 season and below is a table giving the land damage for the 1955 season by States.

Land Damaged this Season (As of June 1, 1955)

States	Cropland	Rangeland	Other Land	Total Land
	Acres	Acres	Acres	Acres
Southern Great Plains:				
Colorado	3,714,000	2,149,000	112,000	5,975,000
Kansas	2,643,000	52,000	31,000	2,726,000
New Mexico	654,000	1,148,000	86,000	1,888,000
Oklahoma	663,000	14,000	13,000	690,000
Texas	<u>1,591,000</u>	<u>270,000</u>	<u>59,000</u>	<u>1,920,000</u>
Subtotal	9,265,000	3,633,000	301,000	13,199,000
Northern Great Plains:				
Montana	141,000	8,000	11,000	160,000
Nebraska	325,000	48,000	10,000	383,000
North Dakota	595,000	18,000	1,000	614,000
South Dakota	283,000	1,000	0	284,000
Wyoming	<u>183,000</u>	<u>948,000</u>	<u>18,000</u>	<u>1,149,000</u>
Subtotal	1,527,000	1,023,000	40,000	2,590,000
GRAND TOTAL	10,792,000	4,656,000	341,000	15,789,000

As a result of continued, widespread damage from wind erosion in the Southern Great Plains, the Soil Conservation Service joined with other agencies of the Department in the development of a long range program for the Great Plains. This program was based on information developed from the soil surveys and land capability classifications conducted by the Service. About one-third of the critical area damaged by wind erosion in the Great Plains has been covered with soil surveys by the Soil Conservation Service. Land capability classifications have been developed in the 195 soil conservation districts, a part or all of which lie in this critical, damaged area. The program of on-site technical assistance to farmers and ranchers in districts, which has proven successful, was accelerated in order that the damage be reduced. Other programs of the Department, including those of credit in Farmers Home Administration, crop insurance, cost sharing in the application of conservation measures, and others, are being tied to the land classification and soil conservation program.

Soil surveys, land classification, and application of soil and water conservation measures in the Great Plains area are being further accelerated in the 1956 fiscal year.

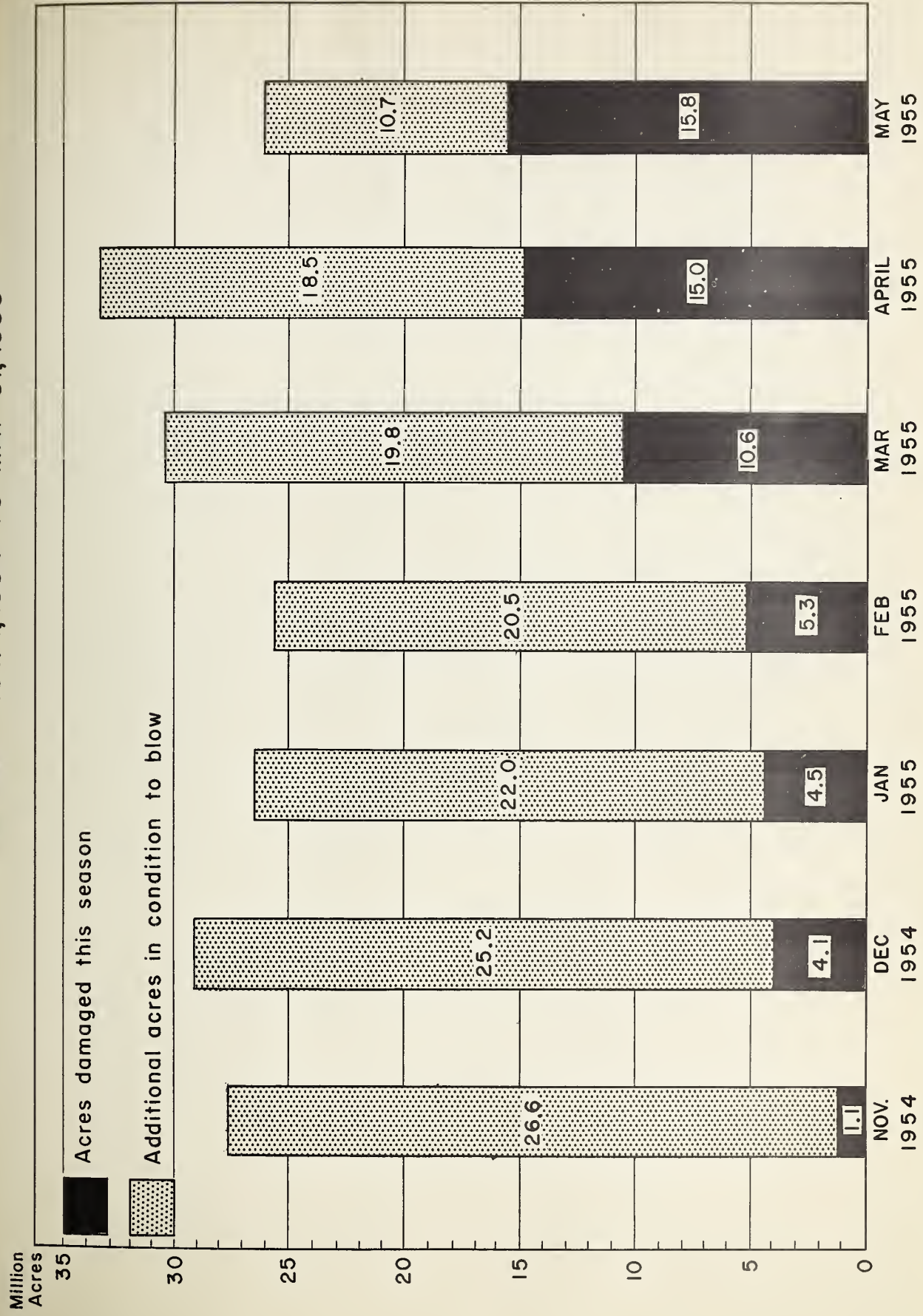


GREAT PLAINS AREA

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
APRIL 1, 1955

BOUNDARY OF MAJOR AREAS WHERE LAND
DAMAGE BY WIND EROSION HAS OCCURRED.
ALSO, DAMAGE HAS OCCURRED IN OTHER
WIDELY SCATTERED AREAS.
MOST SERIOUSLY DAMAGED AREAS.

ESTIMATES OF ACRES DAMAGED AND ACRES IN CONDITION TO BLOW
GREAT PLAINS - NOV. 1, 1954 TO MAY 31, 1955



Effectiveness of Reorganization

As of June 30, 1955, the Soil Conservation Service had completed the first full year of operation on the Washington-State Office basis which resulted from the reorganization of the Service during the previous fiscal year. While, at the beginning of the 1955 fiscal year, all states had assumed the full operating responsibilities assigned to them under the reorganization plan, there was still a big job to do in developing a smooth functioning organization. State offices were confronted with the problem of working out procedures and methods to carry out their new responsibilities. A large number of employees in these offices were still relatively inexperienced in their work and many employees, because of a change to new headquarters, had to make adjustments to the new surroundings. Even experienced personnel required training because of many changes in procedures necessitated by the new organization. For the most part, personnel have readjusted themselves and through training and experience gained on the job have developed to the point where they are functioning satisfactorily. Considering all of these factors the present organization is operating very well. All offices are continually reviewing operations and staffing to improve efficiency of operations to the end that better service will result to landowners in getting conservation practices applied to the land.

Progress in Internal Improvements

During the first year of operation under the new Washington-State organization and as a part of the Washington Office management responsibility, the Service recognized the need for a number of internal improvements and organizational adjustments to assure that maximum benefits were received for each dollar expended. There are listed below some of the more important items on which action was taken during the past year to improve the efficiency and effectiveness of Service personnel and to increase production at the field level.

1. Inspection System Installed - In October 1954 the Service put into effect an inspection system designed to provide for comprehensive analysis and review of work being performed by every office in the agency. Each office is inspected annually to determine adequacy of and balance between all phases of the program. Functional inspections for special phases such as engineering, classification, budgetary work, and farm conservation planning are correlated with the general or program inspection. The system includes complete administrative follow-up on all items requiring attention or action. All State and Territorial offices, Cartographic Units, and Engineering and Watershed Planning Units were inspected by August, 1955, and all areas and work units will have been inspected by the end of the calendar year 1955. Very considerable improvement in administration is resulting through the use of this system, which will be continued as a regular part of the Service's scheduled activities.

2. Administrative Procedures Manual Issued - In February 1955 the Service issued an Administrative Procedures Manual containing simple how-to-do-it instructions on all phases of administrative work at the field level. Written for technicians as well as clerical personnel, the manual was placed in all field offices below the State Offices. It set up uniform administrative procedures for the more than 3,000 field offices throughout the country and is kept up to date by periodic revisions, as necessary. Its value lies in the fact that the personnel in each of these offices will be performing their administrative work in a uniform manner.
3. Operations Management System Installed - Placed in use at the beginning of the fiscal year 1955, the operations management system is aimed at getting maximum accomplishment of soil and water conservation work of high quality at the lowest possible cost. The system compares with production management systems used by larger industries and business.

The system includes:

- a. Preparation by each office of an annual plan of operations, setting forth what is to be done during the year ahead. It is based on a work load analysis and contains estimates of what is expected to be accomplished in each phase of the work. These plans are reviewed at intervals in comparison with actual accomplishments, and are always reviewed during inspections. In addition they provide the basis for:
- b. Long and short-term schedules which set forth who is to do what, when, and where. Schedules are coordinated throughout the Service to prevent conflicts.
- c. The making of work improvement studies to improve working methods, techniques, procedures and systems.
- d. Production analyses and controls, made to ascertain causes for low and high productivity, and to maintain as high productivity as possible.

Responsibility for staff leadership in this work is placed with a specific individual in Washington and in each State and Area Office. Effects are already noticeable in increased accomplishments, more effective use of time, better planning, work organizing, and scheduling.

4. Establishment of Training Centers - The establishment of the Washington-State organization emphasized the need for an effective, well planned training program within the Service. To facilitate this need, training centers were established at strategic locations in the various sections of the country. An average of about 1,100 new technicians and aides who come to the Service each year will be assigned to these training centers

for a period of intensive training to more quickly place them in full production in furnishing technical assistance to farmers and ranchers in the planning and application of conservation practices. With the exception of the training centers in Texas, each training center serves a group of States. Each has a permanent staff of a training officer and an assistant, with technical field specialists furnishing specialized services as needed.

5. Motor Vehicle Data Improved - Beginning with the fiscal year 1955 there was developed in conjunction with the Annual Motor Vehicle Report, a detailed analysis of operating costs for each motor vehicle included in the fleet of cars and trucks operated by the Service. For the first time the Service had a tabulation of the costs of maintenance and operation of every vehicle by State in convenient form for which each State could make analyses of its fleet operations and make investigations as to why certain units were excessively costly to operate or maintain. It furnished a basis for establishing an orderly equipment replacement program geared to factual operation and cost data and has proved a valuable tool in establishing a program of better equipment management and utilization in each State.
6. Organization Studies Made of Work Units and Areas - Continuing studies are being made by the State and Washington Office to arrive at the optimum staffing and organization pattern for the two basic field units of organization -- the work unit and the area. These studies involve consideration of comparability of individual work units, nature and amount of work load, effectiveness of current ratio of professional to non-professional employees and need for and placement of specialists. As a result of these studies during the year, some work unit and area boundaries have been adjusted, some work units have been consolidated and a few eliminated, long range staffing patterns are being determined, with consequent effect on recruitment and training programs, and some areas have been adjusted in size or eliminated.

(b) Watershed Protection

Appropriation Act, 1956	\$12,000,000
Activities transferred in the 1957 estimates to "Salaries and expenses, Office of the Secretary of Agriculture" for personnel investigations	-5,935
Base for 1957	11,994,065
Budget Estimate, 1957	16,000,000
Increase	<u>+4,005,935</u>

SUMMARY OF INCREASES, 1957

Increase for the planning and installation, on a cost-sharing basis with local interests, of upstream watershed improvement measures in small watersheds	+3,755,935
Increase for watershed surveys and investigations of water resources programs in cooperation with other agencies	+250,000

PROJECT STATEMENT

Project	1955	1956 (estimated)	Increase	1957 (estimated)
1. Watershed planning and works of improvement	a/ \$5,526,079	b/ \$11,744,065	+\$3,755,935(1)	\$15,500,000
2. Surveys and investigations of water resources programs ..	- -	250,000	+250,000(2)	500,000
1955 appropriation available in 1956 ..	1,679,071	- -	- -	- -
Total pay act costs (P.L. 94)	[67,215]	[350,000]	[+82,700]	[432,700]
Total available or estimate	7,205,150	11,994,065	+4,005,935	16,000,000
Transferred to "Salaries and expenses, Office of the General Counsel"	+40,000	- -		
Transfer in 1957 Estimates to "Salaries and Expenses, Office of the Secretary of Agriculture"	+4,850	+5,935		
Total appropriation or estimate	7,250,000	12,000,000		

a/ In addition, \$682,718 was available from prior-year balance.

b/ In addition, \$1,679,071 is available from prior-year balance.

INCREASES

(1) An increase of \$3,755,935 for the planning and installation, on a cost-sharing basis with local interests, of upstream watershed improvement measures in small watersheds.

Need for Increase: During the 1955 fiscal year 353 applications were received from sponsoring groups in small watersheds requesting cooperation of the Department in planning and installing works of improvement programs under the authority of Watershed Protection and Flood Prevention Act of 1954 (Public Law 566, 83rd Congress). This Act provides the basis for cooperation between the Department and the States and local interests in installing works of improvement in small watersheds to prevent erosion, flood water, and sediment damages and to further the conservation, development, utilization, and disposal of water. The local people furnish all easements and rights-of-way and bear an equitable share of the cost of installing improvement measures. Where any water storage capacity is provided in structures for purposes other than flood prevention and features related thereto, the local interests bear all the construction cost of providing such added capacity. They also assume all costs of operation and maintenance of the measures installed on other than Federally-owned lands.

On the basis of data gathered in field examinations of the watersheds and recommendations of the Governors of the respective States or their authorized representatives, priorities are set for each State on approval of watersheds for development of work plans. These serve as the basis for determining the physical and economic soundness of the proposed projects and whether they will be approved for Federal assistance in installing watershed protection works of improvement. After project work plans are approved by cooperating local agencies and the Secretary, and their review by other agencies, approval by Congress as required, or the specified waiting period has expired, whichever is applicable, works of improvement may be initiated. A small sum has been reserved in the current fiscal year to permit beginning installation of works of improvement on some watersheds that may be approved and reach the construction stage quickly.

Sixty-eight watersheds in 33 States were approved for planning in the fiscal year 1955. It is expected that 35 work plans will be prepared and submitted to the Congress during the fiscal year 1956 and that installation of works of improvement will actually begin on 15 of this group this year. The following tabulation indicates the estimated number of applications for assistance and the progress of the work in the fiscal years 1955-1957:

	1955	1956 (estimated)	1957 (estimated)	Total 1955-1957 (estimated)
Applications received ...	353	250	250	853
Watersheds approved for planning	68	100	100	268
Work plans prepared and submitted to the Congress	- -	35	75	110
Initiation of works of improvement	- -	15	75	90

The increase is needed to permit the Department to continue to meet requests of the local people for watershed planning assistance and at the same time help with the installation of improvement measures on the projects for which plans will be approved by 1957.

Plan of Work: It is estimated that \$2,620,000 will be required to meet the increase in the Federal Government's contribution to the contractual cost of the works of improvement to be installed in 1957. These funds would be made available to the local sponsoring organizations as work progresses and they are required to make payments to contractors. The balance of the increase amounting to \$1,135,935 would be used to (1) provide engineering supervision over construction work, (2) establish two additional work plan parties (a total of 38) to meet anticipated expanding planning workload, and (3) to accelerate the establishment of land treatment measures in the watershed areas by assignment of additional soil conservationists, aides, and other technicians needed to help farmers and ranchers with their soil and water conservation and land use problems.

(2) An increase of \$250,000 for surveys and investigations of water resources programs in cooperation with other agencies.

Need for Increase: Section 6 of Public Law 566 authorizes the Secretary to cooperate with other Federal and with State and local agencies to make investigations and surveys of the watersheds of rivers and other waterways as a basis for the development of coordinated programs. Executive Order 10584 prescribes rules and regulations relating to the administration of the Watershed Protection and Flood Prevention Act, and directs the Departments of the Army, the Interior and Agriculture to coordinate their resources planning and development work.

Early in the fiscal year 1956 the Department of Agriculture was requested by the Corps of Engineers to cooperate in a review of its Lower Mississippi and Tributaries Project. The Department feels that it should participate in this task if the agricultural phase, which is a major feature of the over-all project, is to be properly considered, planned and developed.

The Department's participation and cooperation in the program will consist of engineering, soil, forestry, hydrologic, economic, sedimentation, land development and cost analysis investigations and studies in the project area. The results of these investigations and studies will be compiled and furnished to the Corps of Engineers for its use in completing the over-all review and will be used by this Department in its consideration of programs that may be recommended.

This activity was initiated in 1956 from unallotted balances under this appropriation for watershed protection planning and works of improvement. It was not included in the 1956 Budget since it was not known at that time that the Department would be called upon to participate in any specific programs contemplated under Section 6. The sum of \$250,000 is

being used for the Department's participation in this review for the 1956 fiscal year and for its participation on a minimum basis in inter-agency program coordination activities elsewhere in the country.

In addition to the activities in the Lower Mississippi valley, the Department is represented on the Inter-Agency Committee on Water Resources which has been established to facilitate coordination in connection with investigations and surveys to be undertaken by the various member Departments and agencies. Much of this work is done in the field. It requires that the Department maintain representation in the field to serve as a point of contact between this Department and the other member Departments and agencies, in order to keep all concerned mutually informed of investigations or surveys undertaken or proposed by the member agencies. The Department maintains such representation on a minimum basis in the Columbia, Upper Colorado, and Delaware River areas, and more extensively in the Missouri River basin. Funds included in this item will be used for such participation as may be necessary with the member agencies in these or other areas.

Plan of Work: The Department will participate with the Corps of Engineers in the review of its report on the Lower Mississippi and Tributaries project by collecting, analyzing and furnishing data and estimates to the Department of the Army on such subjects as:

- (1) Land classification of alluvial lands.
- (2) Present and projected crop yields and distribution.
- (3) Cost of converting woodland to cropland.
- (4) Cost of farm drainage.
- (5) Prospective scale of agricultural development by drainage and clearing as a result of project improvement.
- (6) Increased yields to be anticipated from irrigation if water supplies are provided.
- (7) Current and prospective rates and effects of run-off and sedimentation from hill tributaries flowing directly into alluvial lands.
- (8) Prospective effect of watershed protection programs of the Department on proposed projects.

The Soil Conservation Service, Forest Service and Agricultural Research Service will participate in the review with funds made available under this item. Work plan parties and specialists will assemble data, make field investigations, analyze data and prepare reports on the various agriculture phases of the study. It is estimated that the participation of the Department in this review will be completed by the end of the 1957 fiscal year.

A field advisory committee consisting of representatives from the three department agencies will be established to assure coordination of the separate phases of the Department's work. The Soil Conservation Service will be primarily concerned with the soil and water conservation and watershed improvement phases of the review. The Forest Service will be concerned with forest production possibilities and values and the forestry aspects of watershed improvement in the area. The Agricultural Research Service will conduct analyses to determine the economic aspects of various

possible uses of land and water resources and the impact of such uses on local or national production requirements. A report covering all agriculture phases will be prepared by sub-areas or tributary streams for coordination with the Corps of Engineers' proposals for flood control, major drainage undertakings, and other activities for which it has responsibility.

CHANGE IN LANGUAGE

The estimates include a proposed change in the language of this item as follows (deleted matter enclosed in brackets; new language underscored):

For expenses necessary to conduct surveys, investigations, and research and to carry out preventive measures, including, but not limited to, engineering operations, methods of cultivation, the growing of vegetation, and changes in use of land, in accordance with the Watershed Protection and Flood Prevention Act, approved August 4, 1954 ([Public Law 566] 16 U.S.C. 1001-1007),***

This proposed change in language is to substitute reference to the United States Code in lieu of the Public Law reference previously shown in the appropriation language.

STATUS OF PROGRAM

Examples of Recent Progress:

WATERSHED PLANNING AND WORKS OF IMPROVEMENT

Agency Participation

Allocation of funds to the cooperating agencies in the Department for 1955 and 1956, and proposed for 1957 for planning and installing watershed protection works of improvement is as follows:

Agency	: 1955 : Obligations	: 1956 : Estimate	: 1957 : Estimate
Soil Conservation Service	:\$5,744,605	: \$12,733,905	:\$14,833,000
Forest Service	: 464,192	: 689,231	: 667,000
Total	: 6,208,797	: 13,423,136	: 15,500,000

Distribution of the funds used for planning and installation of improvement measures in the "pilot" watersheds on which work was initiated pursuant to the 1954 Agricultural Appropriation Act, and in those on which works is conducted under Public Law 566, is as follows:

Agency	: 1955 : Obligations	: 1956 : Estimate	: 1957 : Estimate
"Pilot" Watersheds	:\$4,914,132	: \$8,265,585	:\$7,000,000
Watersheds under Public Law 566	: 1,294,665	: 5,157,551	: 8,500,000
Total	: 6,208,797	: 13,423,136	: 15,500,000

Progress in the Development of Watershed Work Plans

Since approval of the Watershed Protection and Flood Prevention Act on August 4, 1954, there has been a rapid and steady increase in interest in watershed projects. This interest is represented by 353 applications for assistance in work plan development received from 37 states by the Soil Conservation Service in the fiscal year 1955. About 500 additional applications were in various stages of development and processing within the States.

Sixty-eight watershed applications in 33 States were approved for work plan development in the fiscal year 1955. It is expected that about 50 watershed work plans will be developed by the end of the fiscal year 1956 of which about 8 were ready to submit to Congress when it convened in January.

Twenty-eight work plan parties were organized during the fiscal year 1955. These consist of professional and sub-professional personnel including engineers, hydrologists, geologists, economists, and supporting aides. The Forest Service assigns foresters to the work plan parties as needed in connection with the forestry aspects of the particular watersheds. In order to meet the increasingly large work load of watershed applications, 8 additional work plan parties are being organized in the fiscal year 1956.

Watershed work plans are being prepared in accordance with the rules and regulations prescribed by the President and the policies of the Secretary of Agriculture and the Administrator of the Soil Conservation Service, supplemented by a Watershed Protection and Flood Prevention Handbook which provides functional procedures and guide lines in the development of watershed programs under the Watershed Protection and Flood Prevention Act (P.L. 566). Memoranda of understanding have also been entered into by the Soil Conservation Service with a number of other Federal agencies to secure specialized assistance in preparing plans for works of improvement. These agencies are the Agricultural Research Service, U. S. Geological Survey, Weather Bureau, and Fish and Wildlife Service. The Weather Bureau and Geological Survey assist with program evaluation by installing and maintaining rain gages and stream flow measuring devices and by compiling rainfall and runoff data. The Fish and Wildlife Service assists in the development of watershed work plans where detailed studies are necessary to properly integrate measures for fish and wildlife conservation into the watershed work plans. The Agricultural Research Service furnishes assistance in the economic evaluation of plans for works of improvement and in measuring the economic results of the pilot watershed projects.

The Watershed Protection and Flood Prevention Act places primary responsibility for projects under the Act at the State and local levels. In order to accept this local responsibility, several States have enacted amendments to Soil Conservation District Enabling Legislation so that the authority of the Districts to act as "local organizations" is expressly defined. Two States have enacted amendments to its laws to legally provide for the creation of watershed sub-districts within Soil Conservation Districts. One State has enacted legislation providing for the creation of a State Water Board. Two States have enacted legislation to provide authority to counties and towns to exercise taxing powers for the specific purpose of aiding in local participation in the Watershed Protection and Flood Prevention projects. Two States have enacted Water District Legislation and one State has enacted legislation providing for water management districts. One State has amended existing drainage legislation and one has enacted Flood Control District Legislation. Similar legislation has been introduced in the legislatures of a number of States.

Accomplishments on Pilot Demonstration Watersheds

When the pilot watershed protection program was authorized in the 1954 fiscal year, the selection of watersheds in which a works of improvement program would be undertaken was based on a reconnaissance type survey or on surveys made in many cases under the flood prevention program several years earlier. Many changes in watershed conditions had taken place since the original surveys were made requiring that improvements be made in the original plan of operation. Also, further investigation revealed cases of unfavorable cost-benefit ratios, unsuitable foundation conditions at proposed structural sites, and inability of local interests to furnish easements and rights-of-way, which has required that the work plans be revised each year to correspond with the program actually being planned. For these reasons the proposed schedule of work for each watershed may vary from year to year until the works of improvement which are to actually be installed in these watersheds can be firmly established. A work plan has been completed or essentially completed for each of the "pilot" watersheds on which work was commenced in the 1954 fiscal year. These work plans specify the land treatment and water control measures necessary to stabilize the watershed lands and reduce floodwater and sediment damage and include a schedule for installation of the recommended measures.

At the request of the local sponsoring groups, authorizations for two projects, Muster Creek in Montana and Adobe Creek in California were cancelled during the year. At the end of the 1955 fiscal year there were 58 active "pilot" projects in which the installation of land treatment measures and structural works of improvement is progressing at essentially the planned rate.

The local soil conservation districts which are either sponsoring or co-sponsoring the "pilot" watersheds have contributed very materially to the progress of the work. As sponsors, they have the responsibility for obtaining the necessary easements and rights-of-way for structural and other works of improvement and for the operation and maintenance of the installations. They also have the responsibility for obtaining as large a contribution to the program as possible by the local people. The work plans indicate that local people and organizations will contribute about 56 percent of the total cost of the watershed works of improvement.

Watershed Improvement Measures in Pilot Watersheds

The following tables show the progress in completing soil surveys and conservation plans on the farms and the major watershed improvement measures planned and installed cooperatively by the Department and local co-operators in the "pilot" watersheds. Structural and land stabilization measures are being installed primarily by local contractors. The Service is also providing additional technical assistance to farmers and ranchers in planning and establishing soil and water conservation practices and sound land use. The purpose is to accelerate the application of land treatment measures which contribute to flood prevention and thus provide necessary protection to structural and other works of improvement installed primarily for flood prevention.

Soil Surveys and Farm Conservation Plans:

Item	Totals in Project Area		
	(Including "Conservation		
	Operations")		
	Cumulative		
	June 30, 1955		Funds
Soil surveys (Acres).....	1,987,404		63,502
Total number cooperators ...	7,817		1,506
Basic conservation plans:			
Number	5,238		1,060
Acres	949,603		133,241

Works of Improvement:

Measure	Estimated		
	Unit: need shown		
	in work plan		
		as of June 30, 1955	with Watershed Protection Funds
Land Treatment Measures:			
Contour farming	Acre: 251,842	99,126	13,719
Cover cropping	Acre: 143,382	47,455	16,462
Crop residue management	Acre: 484,847	172,481	39,175
Strip cropping	Acre: 109,187	16,618	1,699
Pasture seeding	Acre: 114,782	54,475	5,449
Revegetation	Acre: 41,219	3,514	1,525
Range improvement	Acre: 216,887	54,258	7,900
Terraces	Mile: 20,228	6,379	704
Diversions	Mile: 1,872	472	46
Farm ponds	No. : 3,320	1,945	125
Waterway development	Acre: 18,928	17,640	716
Tree planting	Acre: 59,844	8,313	2,502
Woodland protection	Acre: 424,689	41,643	17,306
Wildlife area improvement ...	Acre: 7,491	2,923	311
Erosion cont. struc.	No. : 14,732	3,058	30
Contour furrowing	Acre: 5,307	1,461	761
Stock trails and driveway ...	Mile: 36	19	18
Water developments	No. : 23	22	18
Forest fire protection	Acre: 182,728	80,677	27,498
Fencing for grazing control .	Mile: 638	116	63

Works of Improvement: - (Continued)

Measure:	:	: Estimated	: Accomplished	: 1955 (Actual)
	:	: Unit; needs shown	: as of June	: with Watershed
	:	: in work plan	: 30, 1955	: Protection Funds
Structural and Land	:	:	:	:
Stabilization Measures:	:	:	:	:
Floodwater-retarding	:	:	:	:
structures	(:No. :	565	:	60
	(:Ac.Ft.:	185,489	:	32,591
	:	:	:	31,584
Stabilization and sediment	:	:	:	:
control:	:	:	:	:
(a) Structures	:No. :	4,877	:	2,116
(b) Silt and debris	:	:	:	:
basins	:No. :	362	:	92
	:	:	:	34
Subwatershed waterway	:	:	:	:
improvement:	:	:	:	:
(a) Outlet construction	:Mile :	391	:	24
	:	:	:	11
Stream channel improvement:	:	:	:	:
(a) Channel stabilization ..	:Mile :	280	:	20
(b) Channel improvement	:Mile :	552	:	45
	:	:	:	33
Diversion ditches and	:	:	:	:
dikes:	:	:	:	:
(a) Diversion construction .	:Mile :	81	:	7
(b) Levees and dikes	(:Mile :	11	:	8
	(:Cu.Yd.:	385,322	:	290,000
	:	:	:	290,000
Stabilization of critical	:	:	:	:
areas:	:	:	:	:
(a) Roadside erosion control..	:Mile :	724	:	173
(b) Revegetation:	:	:	:	:
1. Grasses and legumes ...	:Acre :	29,392	:	4,818
2. Woody plants	:Acre :	41,323	:	7,062
	:	:	:	3,745
(c) Special purpose terraces..	:Acre :	2,339	:	1,434
(d) Stabilization of logging :	:	:	:	:
roads	:Mile :	39	:	5
	:	:	:	2

Program Evaluation

Studies have been initiated by the Service for the purpose of determining the effectiveness of the measures applied in the "pilot" watersheds. The intensity of these studies varies considerably among the watersheds depending upon the measures to be installed and the expected results. Eight of the watersheds have been selected for a fairly intensive type of evaluation. In these watersheds more rain gages and stream flow recorders have been installed and more detailed basic information is being obtained on land use, cover, soils, and erosion conditions. The Geological Survey and Weather Bureau are participating in this work by furnishing equipment and services on a reimbursable basis. Studies to date indicate that some phases of the evaluation work will not be conclusive unless the studies are extended beyond the presently scheduled period of five years.

Status of Work on Individual Demonstration Watersheds

In the hearings on this item in the 1954 Agriculture Appropriation Act which provided funds to begin development of pilot watershed projects to serve as demonstration of the effectiveness of watershed protection measures in preventing floods, the Federal cost of the improvement measures was estimated at \$28,706,000. Forty-eight watershed areas were selected from those in which the Service had previously made investigations and determination that it appeared feasible to carry out a works of improvement program. The cost estimates were based on these preliminary investigations. Subsequently some of the original forty-eight projects were replaced by others due to unfavorable cost-benefit ratio, inability to get local interests to assume their share of the project responsibility, or for other reasons. Several additional projects were designated for installation of improvement measures. At the present time 58 pilot projects are in an active construction stage. Detailed work plans were prepared for each of these watersheds. The current work plans indicate that construction costs have increased about 10% over the estimates made when the program was begun in 1954. In addition there are increased costs of engineering design, supervision, and administrative work due to the increases granted by the Federal Employees Salary Increase Act of 1955. The total Federal cost to complete the planned improvement measures for these watersheds is now estimated to be about \$31,800,000. Some difficulty has been experienced by local interests in securing easements and rights-of-way for structure sites. This will delay completion of the installation of improvement measures on some of the projects. It is now estimated that it will require a period of about 8 years to complete all phases of the pilot watersheds rather than the original estimate of 5 years.

The following statements for each of the pilot demonstration watersheds shows the status of the project, significant accomplishments, and some of the major flood prevention measures planned for installation by the Department and local cooperators. Also shown is the total estimated Federal Cost for each of the 58 active projects and total obligations through June 30, 1955 for all projects including those for which authorizations have been cancelled.

ARIZONA

White Tanks

Total Estimated Federal Cost \$219,000
Total Obligations through June 30, 1955 \$213,374

All construction work on this project was completed in July 1954, Works of improvement primarily for flood prevention consisted of 2 earth-fill floodwater-retarding structures (2,655 and 1,026 acre feet), 6 debris and desilting basins, and 11 miles of diversion dikes and ditches. All planned land treatment measures which contribute to flood prevention have been applied by the sponsors. The local people paid \$215,537 and the Federal Government \$192,088 of the total installation costs on this project. Evaluation studies of the effectiveness of the land treatment measures and works of improvement installed are continuing.

Squaw Peak - South Mountain

This project has not been authorized because no qualified local agency was willing to sponsor it.

ARKANSAS

Six Mile Creek

Total Estimated Federal Cost..... \$1,596,000
Total Obligations through June 30, 1955 799,308

As of June 30, 1955, thirteen of the twenty-six floodwater retarding structures planned for this watershed had reached the contract stage. Earthwork has been completed on nine structures and construction work has begun on the other four. Surveys have been completed and core-drilling operations are in progress on ten additional structure sites preparatory to construction in 1956. There are 630 farmers in the watershed area involving an estimated 101,000 acres of land (70 percent of the agricultural land in the watershed) who have developed conservation farm plans for their farms and about 60 percent of the planned land treatment measures have been installed. The Forest Service has placed 21,600 acres of woodland under forest fire protection and in the past year planted 60 acres of trees on agricultural land to stabilize severe sediment producing areas. Also, 234 acres of trees were planted within the National Forest area of the watershed. Easements and rights-of-way having an estimated value of \$60,000 have been donated by approximately 150 landowners to permit the construction of the thirteen floodwater retarding structures.

Adobe Creek

Total Obligations through June 30, 1955 \$50,008

Authorization for this project was withdrawn effective April 1, 1955 at the request of the sponsors.

Calleguas Creek

Total Estimated Federal Cost \$1,561,000
Total Obligations through June 30, 1955 347,683

The major works of improvement planned for this watershed are 8 floodwater retarding structures, 8 stabilization and sediment control structures, 163 debris basin and channel grade stabilization structures, 19 miles of diversion ditches and dikes, 8 miles of streambank stabilization, and about 40 miles of channel capacity improvement.

As of June 30, 1955, eight stabilization and sediment control structures, approximately one mile of channel capacity improvement, and about 1-1/2 miles of stream bank stabilization had been installed in this watershed. Bids covering contracts for an additional 33 stabilization and sediment control structures, about 2-1/2 miles of channel capacity improvement, and about 5 miles of streambank stabilization had been opened by June 30 and contracts were awarded early in the current fiscal year. Rain gages, stream flow gages, and sediment measuring devices have been installed to collect data on the effectiveness of the program planned for the watershed.

Walnut Creek

Total Estimated Federal Cost \$2,316,000
Total Obligations through June 30, 1955 \$ 380,393

The major works of improvement planned for this watershed are 164 stabilization and sediment control structures, about 10 miles of streambank channel stabilization, and about 44 miles of channel capacity improvement. During the 1955 fiscal year contracts were awarded for 3 drop spillway structures, .2 mile of stream channel improvement, and 1 drop inlet structure. Contracts for an additional 3 drop spillway structures, 2,000 feet of stream channel improvement, and 1 floodwater retarding structure were awaiting award at the end of the fiscal year.

COLORADO

Kiowa Creek

Total Estimated Federal Cost	\$600,000
Total Obligations through June 30, 1955	\$118,629

Four floodwater retarding structures have been completed in this watershed. Contracts have been awarded for 8 additional floodwater retarding structures. Engineering design and specifications preliminary to advertising for bids on 7 additional structures were nearing completion by the end of the 1955 fiscal year. It is expected that surveys, core drilling and site selection for a total of 100 floodwater retarding and stabilization structures in this watershed will have been completed early in the current fiscal year. Plans are nearing completion for the installation of rain and streamflow recording devices for evaluation of the effectiveness of the program to be installed in this watershed.

GEORGIA

North Fork of the Broad River

Total Estimated Federal Cost	\$726,000
Total Obligations through June 30, 1955	\$182,400

The major flood prevention measures planned for this watershed are 10 floodwater retarding structures, 15 stabilization and sediment control structures, 40 miles of stream channel improvement, 96 miles of roadside erosion control and treatment of 3,666 acres of critical runoff and sediment producing area. Three floodwater retarding structures are complete and 2 additional are under contract. Other measures already installed include 1 mile of stream channel improvement, 1 stabilization and sediment control structure, 13 miles of roadside erosion control, and treatment of 1,720 acres of severe sediment producing area. Over 1,000 acres has been retired to woodland by planting pine seedlings.

IDAHO

Dry Creek

Total Estimated Federal Cost	\$261,000
Total Obligations through June 30, 1955	\$ 77,920

The major works of improvement planned for installation in this watershed are 37 stabilization and sediment control structures, about 14 miles of stream channel improvement, and 3 to 4 miles of stream capacity improvement. Some of the works of improvement will be installed in the National Forest areas of the watershed. Revegetation of critical sediment producing areas on both national forest and private lands totalling about 425 acres, and, stabilization of

about 30 miles of roadside erosion are other conservation practices planned for the watershed.

In order to carry out the works of improvement program it has been necessary for the local people to form a flood control district to enable financing through taxing powers. For this reason no major works of improvement have been installed to date. The Forest Service, in cooperation with the State Forester has placed 1,000 acres of forest range under fire protection, and at present is working on six miles of roadside improvements. During the past six months 120 acres of range land has been seeded to legumes and grasses, and an additional 1,000 acres will be seeded early this fiscal year. Approximately 3.5 miles of range fence was constructed during the past year and additional fencing for improved range management and protection of seedlings is planned for this fall.

ILLINOIS

Hadley Creek

Total Estimated Federal Cost.....	\$1,180,000
Total Obligations through June 30, 1955	\$ 139,289

The major works of improvement planned for this watershed are 4 floodwater retarding structures, 331 stabilization and sediment control structures, 80 miles of sub-watershed waterway improvement, 1.5 miles of stream channel improvement, and 21 miles of diversion ditches and dikes. Nineteen structures have been completed. Surveys and core-drilling operations have been completed on an additional 15 structure sites and designs and specifications will be completed early in the current fiscal year. Ninety percent of the 241 landowners in the watershed have become soil conservation district co-operators, and basic plans have been developed for 27 farms. As of June 30, 1955, 10 miles of sub-watershed waterways, 3 miles of diversion dikes and 6 miles of diversions, 18 miles of terraces, 25 acres of sod waterways, and 850 acres of pasture seeding had been installed on the land along with vegetation of 6 acres of a severe sediment producing area. In cooperation with the Forest Service woodland management plans have been developed for 14 farms with an additional 7 nearing completion by the end of the fiscal year. Three fire departments have expressed an interest in assisting in fire control in the watershed area.

Money Creek

Total Estimated Federal Cost	\$243,000
Total Obligations through June 30, 1955	\$ 21,323

The major works of improvement planned for this watershed are 93 stabilization and sediment control structures, 12 miles of waterway improvement, and 2.7 miles of diversion ditches and dikes. No structures have been installed to date, however, designs have been completed for three structures and it is

expected that contracts will be awarded early in the current fiscal year. The Soil Conservation District Board has set a policy that no structural measures are to be installed until the entire watershed above the structure is being operated on a soil and water conservation basis or the landowner has agreed to a basic conservation plan. To date there are 107 cooperators in the Soil Conservation District and 31 basic plans have been prepared for farms in the watershed. The following practices have been installed: contouring - 1,229 acres; terracing - 7.8 miles; waterway - 29 acres; tree planting - 50 acres.

Old Tom Creek

Total Estimated Federal Cost	\$212,000
Total Obligations through June 30, 1955	\$ 84,339

The major works of improvement planned for this watershed are 26 stabilization and sediment control structures and 12.4 miles of waterway improvement. Three structures have been installed and 5 were under construction at the end of the 1955 fiscal year, 5 additional structures have been designed. One multiple purpose structure is being designed in cooperation with the County Board of Supervisors to serve as a public road. The County Board of Supervisors and Township Committee have agreed to pay \$6,000 of the installation cost of this structure. Farmers have in the past been conservation minded in this watershed and have made and are making a conscientious attempt to solve their problems. A Sub-watershed waterway improvement project between two of the structures has been completed by one of the land owners at a cost of \$1,200. Two other land owners are doing all the clearing necessary (approximately 18 acres) above the proposed road structure at a cost of \$2,500 to them. Land owners also cooperated in the closing of the partially abandoned road to allow for construction of one structure.

INDIANA

Flat Creek

Total Estimated Federal Cost	\$283,000
Total Obligations through June 30, 1955	\$ 94,342

The major works of improvement planned for the Flat Creek Watershed Protection Project are two floodwater retarding structures, 52 stabilization and sediment control measures, 7-1/2 miles of stream channel improvement, and 27 miles of roadside erosion control and about 5,000 acres of tree planting for the stabilization of critical runoff and sediment producing areas. Three stabilization and sediment control structures have been completed, 6 are under construction, and 6 more are scheduled for construction in fiscal year 1956. Also, scheduled for fiscal year 1956 are 2-1/2 miles of stream channel improvement. The Forest Service, in cooperation with the

State Division of Forestry, has installed 235 acres of tree planting. Cooperative forest fire control is being intensified on 7,886 acres of woodland, and technical assistance was provided to the owners of about 1,000 acres of timberland for marking and harvesting the timber according to sound watershed principles.

IOWA

Floyd River Tributaries Upper Plymouth Creek and Nassau Watershed

Total Estimated Federal Cost	\$156,000
Total Obligations through June 30, 1955	\$ 17,312

The major works of improvement planned for this watershed are 6 stabilization and sediment control structures, and 406 miles of detention terraces. None of the structural work has been completed although final work plans were approved by the District Commissioners at their May meeting. The conservation practices that have been established to date include 3,590 acres of contour farming, 29.3 miles of terracing, 15 acres of waterway development, and about 3 miles of tile drains in connection with waterway development.

Honey Creek

Total Estimated Federal Cost	\$244,000
Total Obligations through June 30, 1955	\$103,440

The major works of improvement planned for this watershed are 40 stabilization and sediment control structures, 3.6 miles of waterway improvement, 14 miles of roadside erosion control, and stabilization of 40 acres of critical runoff and sediment producing area. Nine floodwater retarding and stabilization structures have been completed, 4 are in the process of design and field surveys have been completed for 3 more. Lucas County has contributed \$3,549 on two of the structures and has also constructed two erosion structures along a newly graded farm-to market road. The land owners and operators have seeded the dams, and constructed 2,000 feet of outlet ditches and 400 feet of diversions. Three land owners have completed construction of 4,200 feet of open ditch below the structures in one sub-watershed. The Forest Service cooperated in getting 7 acres of pine trees planted in one critical area.

Mule Creek

Total Estimated Federal Cost	\$459,000
Total Obligations through June 30, 1955	\$334,936

The major works of improvement planned for this watershed are 27 stabilization and sediment control structures, 8.6 miles of waterway improvement, and 14 miles of roadside erosion control. Construction has been completed

on 9 structures, 5 more are under construction, and five will be contracted in the fiscal year 1956. Installation of the land treatment measures has been accelerated.

The public interest generated by the activities in Mule Creek area have been far in excess of expectations. There is a constant demand upon District personnel to conduct tours through the Watershed. In the first six months of 1955, eighteen tours have been conducted by the District Office and on such tours 464 farmers and business men have attended.

KANSAS

Aiken Creek

Total Estimated Federal Cost	\$112,000
Total Obligations through June 30, 1955	\$ 96,739

The one floodwater retarding structure included in the work plan for this watershed was completed in the fall of 1954. Some additional work remains in establishing a satisfactory protective vegetative cover. Rains fell in May which local farmers feel would have flooded bottomland and damaged crops had the reservoir not been there. The water in the sediment pool has been stocked with fish, and other recreational activities such as boating and swimming are available. A field day, sponsored by the Chautauqua Soil Conservation District, was held in May 1955. The event was well attended by rural and city people interested in soil conservation and flood prevention.

Bill's Creek

Total Obligations through June 30, 1955	\$ 20,973
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Authorization for this project was withdrawn at the request of the sponsors effective July 1, 1954.

Little Delaware-Mission Creek

Total Estimated Federal Cost	\$431,000
Total Obligations through June 30, 1955	\$162,156

The major works of improvement planned for this watershed are 8 floodwater retarding structures, 25 stabilization and sediment control structures, and 6.4 miles of waterway improvement. Three floodwater retarding structures have been completed and another is under construction. Two grade stabilization and sediment control dams have been completed, two are in the final stages of construction and four others are ready for contract action. Field surveys are being conducted at present to obtain data for exact locations and design of the remaining grade stabilization structures. It is expected that design work will be completed on one additional floodwater retarding

structure for contract action early in the 1956 fiscal year. Application of land treatment measures continue at scheduled rates. A comparison of aerial photos for 1941 and 1954 shows very strikingly the physical progress which has been made in application of conservation measures in the interval between the photo flights. An outstanding field day was held on August 18, 1954 in the watershed. The field day involved tours by truck to land treatment and structural works in the watershed.

Lost Creek

Total Estimated Federal Cost	\$153,000
Total Obligations through June 30, 1955	\$ 25,425

The major works of improvement planned for this watershed are 3 floodwater retarding structures, 5.5 miles of channel capacity improvement, and 6.3 miles of floodways. Surveys and final design have been completed for one floodwater retarding structure and bid invitations for a contract were issued in July 1955. Application of land treatment measures has been below scheduled rates due to drought conditions which has retarded vegetative work and has adversely affected farmer-spending for land treatment.

Snipe Creek

Total Estimated Federal Cost	\$161,000
Total Obligations through June 30, 1955	\$103,031

The major works of improvement planned for this watershed are 9 floodwater retarding structures and 32 acres of woody plantings to stabilize critical run-off and sediment producing areas. Three floodwater retarding structures have been completed and two more are now under construction. Surveys and design have been completed on one additional floodwater retarding dam for construction early in 1956. This will mean six dams completed by the fall of 1955 out of a system of nine contained in the work plan. Very good stands of protective vegetation has been secured on the dams built in 1954. Land treatment application continues at a good rate, with numerous farms fully protected by proper conservation measures.

Switzler Creek

Total Estimated Federal Cost	\$310,000
Total Obligations through June 30, 1955	\$ 81,914

The major works of improvement planned for this watershed are 5 floodwater retarding structures. One floodwater retarding structure has been completed and another is now under construction. An excellent

stand of vegetation was obtained on the completed structure. The City of Burlingame, Kansas, has submitted a proposal for obtaining capacity for a municipal water supply in one of the floodwater retarding reservoirs yet to be constructed. The proposal is to build a multiple use reservoir to include about 1200 acre feet of storage for city use in addition to sediment and floodwater storage. The city will pay for the cost of the additional storage capacity. The continuation of the drought through the 1954 crop year has retarded land treatment. Rainfall in 1955 has been favorable, resulting in excellent wheat, barley and oats crops. It is expected that the favorable crop outlook will stimulate land treatment application in the 1956 fiscal year.

KENTUCKY

North Fork of Rough River

Total Estimated Federal Cost	\$337,000
Total Obligations through June 30, 1955	\$118,591

The major works of improvement planned for this watershed are 2 floodwater retarding structures, 10 miles of waterway improvement, 5 miles of roadside erosion control, and stabilization of 7,055 acres of critical runoff and sediment producing areas, of which 998 acres are woody plantings planned by the Forest Service. One of the floodwater retarding structures is under construction and it is expected that the second structure will be constructed during the fiscal year 1956. The program of revegetation of critical areas within the watershed has accelerated at a very gratifying rate. The vegetative program is most essential in this particular watershed because the slopes are steep and the terrain is very rough with shallow soils, which contribute to a rapid rain runoff and high soil losses. Contour farming, pasture seeding, waterway development, and pasture improvement by the farmers have increased approximately 75% since the beginning of the program and the farmer's interest is increasingly more evident.

The Forest Service, in cooperation with the Kentucky State Division of Forestry, has assisted in tree planting, intensified forest fire protection, and provided technical guidance in the harvesting of timber to prevent impairment of watershed values. As of June 30, 1955, a total of 110,000 trees had been planted on 110 acres and 400 acres of timber had been harvested under sound watershed protection principles.

The Kentucky Highway Department has cooperated in road bank stabilization work throughout the watershed. They have sloped and prepared the banks for seeding, fertilized them, seeded them to fescue, and have mulched with straw that part of the roadbank within the watershed boundary. At other locations, which are not adaptable to sloping and seeding, they have planted Kudzu crowns. This participation in the watershed program has induced the Superintendent of Maintenance of the Highway Department to treat and stabilize many more miles of road banks which are not within the watershed boundaries.

Plum Creek

Total Estimated Federal Cost	\$507,000
Total Obligations through June 30, 1955	\$178,215

The major works of improvement planned for this watershed are 13 floodwater retarding structures, 95 miles of waterway improvement, 21 miles of stream channel improvement, 12 miles of roadside erosion control, and 685 acres of revegetation of critical areas, 235 acres of which are woodland plantings planned by the Forest Service.

As of June 30, 1955, one floodwater retarding structure had been completed, four were under construction, and five additional are being designed. Three miles of subwatershed waterways have been shaped and vegetated.

The Geological Survey and Soil Conservation Service personnel are making intensive study of the effects of flood prevention and watershed protection measures in this pilot watershed using the following devices: 3 stream gages, 1 pond gage, 2 recording rain gages, 6 non-recording rain gages, 1 tipping bucket rain gage, 2 crest stage indicators, and 3 staff gages.

The land treatment measures completed are 709 acres of contour farming, 1.1 miles of diversions, 17 ponds, 2.3 miles of terraces, 5.5 acres of waterways, 944 acres of pasture improvement, and 59 acres of cover crops. The Forest Service in cooperation with the Kentucky State Division of Forestry provided technical assistance for harvesting 30 acres of timber without damaging watershed values.

Red River Watershed

Total Estimated Federal Cost	\$600,000
Total Obligations through June 30, 1955	\$162,958

The major works of improvement planned for this watershed are 185 miles of stream channel improvement, 51.3 miles of roadside erosion control, revegetation of 9,585 acres of critical sediment producing areas, of which 3,000 acres are woody plantings planned by the Forest Service.

About 2.4 miles of major channel improvement has been completed and an additional contract for 1.6 miles has been awarded. Excavation for 1/2 mile on the latter contract has been completed but the stabilization measures have not been applied to the channel.

Establishment of conservation practices to the critical flood source areas, include 1,100 acres seeded to grasses and legumes, 285 acres planted to trees, and 5.3 miles of highway roadbanks stabilized. The Forest Service, in cooperation with the Kentucky State Division of Forestry, has assisted in the tree planting and provided technical assistance for the harvesting of timber without damaging the watershed. Seven miles of fence have been installed to protect from grazing newly established forest plantations on critical areas.

Upper Green River

Total Estimated Federal Cost	\$373,000
Total Obligations through June 30, 1955	\$149,369

The major works of improvement planned for this watershed are 5 floodwater retarding structures, 12 miles of stream channel improvement, 3 miles of roadside erosion control, and revegetation of 15,032 acres of critical sediment producing areas, of which 220 acres are woody plantings planned by the Forest Service.

Two hundred acres of critical sediment producing areas have been seeded to sericea lespedeza and another hundred acres are being prepared for seeding to Kentucky 31 Fescue. One floodwater retarding structure is under construction and designs and specifications are nearing completion for three additional structures. Four and one-half miles of stream channel improvement have been completed.

The Forest Service, in cooperation with the Kentucky State Division of Forestry, has assisted in establishing about 70 acres of flood prevention tree planting and constructed 9 miles of fence to protect the newly established plantations from grazing, intensified cooperative forest fire control, and provided technical assistance in the harvesting of 400 acres of timber without impairment of watershed values.

MINNESOTA

Chippewa River Tributaries

Total Estimated Federal Cost	\$1,751,000
Total Obligations through June 30, 1955	\$ 72,263

The major works of improvement planned for the Chippewa River Watershed are 5 floodwater-retarding structures, 55.3 miles of floodways, and 14 miles of river channel improvement. Through the 1955 fiscal year final work plans had been prepared on two of the tributaries to the Chippewa River. These are Shakopee Creek Watershed and Mud Creek Watershed, including Chippewa River Improvement below its outlet into the river. Because of its size and complexity, this project is still in the design stage. However, all the structural measures for Shakopee Creek sub-watershed will be under contract during the 1956 fiscal year. The land treatment program of establishing conservation practices is proceeding satisfactorily.

South and North Fork of the Crow

This project has not been authorized because no qualified local agency was willing to sponsor it.

East Willow Creek

Total Estimated Federal Cost	\$349,000
Total Obligations through June 30, 1955	\$ 78,842

The major works of improvement planned for this watershed are 12 floodwater retarding structures and 41 gully-stabilization structures, 25 miles of waterway improvement, three miles of stream channel improvement, and 5 miles of roadside erosion control. Five stabilization and one floodwater retarding structure have been installed and turned over to the local sponsor. Two floodwater retarding structures are under construction. During the 1955 fiscal year conservation practices applied to farms in the watershed include 450 acres of strip cropping, 9 miles of terraces, 31 acres waterway development, 27 acres wildlife area development, 7 acres tree planting, 330 acres forest management, and 295 acres pasture seeding.

MISSOURI

East Branch of South Fork of Blackwater

Total Estimated Federal Cost	\$288,000
Total Obligations through June 30, 1955	\$120,756

The major works of improvement planned for this watershed are 30 stabilization and sediment control structures, 2.8 miles of waterway improvement and 2.9 miles of diversion ditches and dikes. Five stabilization and sediment control structures, .7 mile subwatershed waterway improvement, .8 mile diversion ditches and dikes have been established.

Only two contracts were awarded during the 1955 fiscal year. Because of the badly eroding lands above the proposed structure sites emphasis has been placed on stabilizing these sediment producing areas in the watershed before awarding contracts for the structures in order to protect the reservoir against damage from silt deposits.

Reseeding of farm waterways and terrace outlets was necessary since the extended drought period had prevented getting a satisfactory sod established in the fall of 1954.

Lost Creek

Total Estimated Federal Cost \$210,000
Total Obligations through June 30, 1955 \$ 76,687

The major works of improvement planned for this watershed are 4 floodwater retarding structures, 21 stabilization and sediment control structures and 6.7 miles of waterway improvement. The Forest Service has planned 137 acres of woody plantings for the stabilization of critical runoff and sediment producing areas and one floodwater retarding structure is now under construction. Two stabilization and sediment control structures have been completed and .1 of mile of subwatershed waterway improvement is under construction.

On the land treatment phase of the watershed program 62 farmers owning and operating approximately 80 percent of the watershed lands are cooperating with the Lincoln County Soil Conservation District. Of these, 34 have developed basic farm conservation plans encompassing approximately 50 percent of the watershed area. Landowners in the watershed area have been hard hit by drought the last three years causing failures in establishing vegetative practices. The resulting reduction in farm income coupled with general discouragement in establishment of vegetative practices has prevented many farmers from applying planned conservation measures.

Forestry measures applied include Cooperative Forest Fire Control on 1,535 acres of forest in cooperation with the Missouri Conservation Commission and Elsberry Rural Volunteer Fire Department, and tree planting fill-in stand reinforcement on 11 acres, tree planting field reforestation on 8 acres, Forest Management assistance on 253 acres, forest planning and application assistance on 208 acres.

MONTANA

Muster Creek

Total Obligations through June 30, 1955 \$8,622

Authorization for this watershed was withdrawn at the request of the sponsors effective April 1, 1955.

NEBRASKA

Brownell Creek

Total Estimated Federal Cost \$436,000
Total Obligations through June 30, 1955 \$136,466

The major works of improvement planned in this watershed are 4 floodwater retarding structures and 67 stabilization and sediment control structures.

One floodwater retarding and grade stabilization structure, and 6 stabilization structures have been completed. One floodwater retarding structure

and one grade stabilization structure are now under construction. Engineering designs have been prepared for two additional grade stabilization structures. Land treatment measures have been applied at an accelerated rate throughout the watershed area. The Otoe County Board of Commissioners have shared the cost of one grade control structure built on a county road in the amount of \$3,000.

Dry Creek

Total Estimated Federal Cost	\$258,000
Total Obligations through June 30, 1955	\$ 84,387

The major works of improvement planned for this watershed are 7 floodwater retarding structures, 19 stabilization and sediment control structures, and 1.25 miles of floodways. One floodwater retarding structure and 2 stabilization structures are under construction. Designs have been prepared for one additional stabilization and sediment control structure. Although conservation land treatment is progressing satisfactorily, the lack of adequate land treatment above structure sites in some subwatersheds has forced a delay in immediate plans for structural measures.

The Frontier County Board of Commissioners are cooperating in the installation of a number of Grade Control Structures on county roads.

Two adjacent landowners who will benefit from the Floodwater Retarding Structure now under construction made cash contributions of \$250 each to the landowner upon whose land the structure is built to compensate him for loss to him from water storage.

Indian Creek

Total Estimated Federal Cost	\$887,000
Total Obligations through June 30, 1955	\$230,435

The major works of improvement planned for this watershed are 18 floodwater retarding structures and 111 stabilization and sediment control structures. One floodwater retarding structure, 8 stabilization structures, and 1 mile of subwatershed waterway improvement have been completed. Three floodwater retarding structures and 5 stabilization structures are under construction. Engineering designs have been prepared for three additional stabilization structures. The conservation land treatment program is moving rapidly forward in this watershed. This has enabled the award of construction contracts as soon as designs and specifications could be prepared.

Upper Salt - Swedburg Tributaries of Salt Creek

Total Estimated Federal Cost \$1,618,000
Total Obligations through June 30, 1955 \$ 398,043

The major works of improvement planned for this watershed are 3 $\frac{1}{4}$ floodwater retarding structures, 185 stabilization and sediment control structures, 1.6 miles of waterway improvement, and 0.6 mile of stream channel improvement. Five floodwater retarding structures, 12 grade stabilization structures and 1.6 miles of stream channel improvement have been completed and additional floodwater retarding structure and 2 grade stabilization structures are under construction. Designs for five additional stabilization structures have been prepared. Land treatment has been accelerated in the Upper Salt Creek Tributary (Lancaster County) of the Salt Creek Watershed in a number of the subwatershed areas. However, due to the small amount of land treatment applied at time of designation, and the requirement that land treatment be approximately 75% complete prior to the construction of major structural improvements, the structural program is restricted to a small number of areas.

NEW HAMPSHIRE

Baboosic

Total Estimated Federal Cost \$74,000
Total Obligations through June 30, 1955 \$31,151

There are no structural control measures included in the Baboosic Watershed Work plan. There is a high degree of interest among landowners and operators in establishing the land treatment measures. Twenty-five additional landowners have become district cooperators since the project was authorized. Their holdings cover 2,072 acres. This brings the total cooperators to 140, who own approximately 14,000 acres. There are about 32,000 acres in the watershed.

Satisfactory progress is being made in installing the conservation land treatment measures. They include, 161 acres of strip cropping .5 mile of diversions and terraces, 8 miles of waterways and 155 acres of revegetation.

The New Hampshire Fish and Game Division has one man assigned to the project for development of the wildlife aspects of the program. He is dealing primarily with fish and game populations, habitat improvement, and marsh development.

The State Forester has furnished seedlings for planting 36 acres to trees. The U. S. Forest Service, in cooperation with the State Forester, has provided the technical assistance necessary for planting 46 acres of trees and for harvesting timber without impairment of watershed values.

NEW JERSEY

Pequest Creek

Total Estimated Federal Cost	\$671,000
Total Obligations through June 30, 1955	\$111,186

The major works of improvement planned for this watershed are 17.5 miles of stream channel improvement, 4 miles of diversion ditches, and 800 acres of woody plantings for the stabilization of critical runoff and sediment producing areas.

Commencing work on the 17.5 miles of stream channel improvement has been delayed until the local group had obtained all necessary easements. This has recently been done and designs and specifications are being prepared preparatory to the award of contracts for construction work this fall.

Cooperative field work on the privately owned forest lands was started in April 1954. To date, forest management assistance has been provided to landowners on 5,829 acres of woodlands. During the last six-month of the 1955 fiscal year, 14 owners were assisted in reforesting 32 acres of critical areas for sheet erosion control; detailed management data was collected on 8 ownerships totaling 328 acres of forested land; 310,000 board feet of merchantile timber was marked for cutting on 188 acres of 4 owners; and assistance was provided 26 owners to reforest 35 acres of land. One owner was given assistance in controlling severe deer-browsing on 500 acres of critical watershed woodland. The establishment of other land treatment measures has been accelerated and is on schedule.

NEW MEXICO

Sandia Mt. Tributaries

Total Estimated Federal Cost	\$147,000
Total Obligations through June 30, 1955	\$114,083

The major works of improvement planned for this watershed is one floodwater retarding structure and 370 stabilization structures. Work was started on the floodwater retarding structure on April 18, 1955 and it should be completed in time to control runoff that usually occurs the latter part of August and September.

The Forest Service has constructed 56-1/2 miles of special purpose terraces, as well as 3 miles of terraces on extreme steep slopes. Three hundred and fifty acres of gully control work has been done, supplemented by 370 stabilization structures and 20 acres of woody plantings. The range development and improvement work, consisting of 6 miles of fences, 1,093 acres of contour pitting and 344 acres of contour chiseling, accompanied by good range management look outstanding at the present time.

Upper Hondo Watershed

Total Estimated Federal Cost \$777,000
Total Obligations through June 30, 1955 \$156,459

The major works of improvement planned for this watershed are one floodwater retarding structure, 1,269 stabilization and sediment control structures, 32 debris basins, 16.9 miles of stream channel improvement and 10 miles of special purpose terraces.

On privately-owned lands 43 stabilization and sediment control structures and 9 debris basins have been constructed. The landowners shared the cost of this work with the Federal Government. The floodwater retarding structure, with a capacity of about 4,000 acre-feet, is scheduled to be built during the fiscal year 1956. The Upper Hondo Soil Conservation District Board of Supervisors has encountered some difficulty in obtaining an easement on 918 acres of Federal land within the boundaries of the Fort Stanton Reservation, (the land required to construct the floodwater retarding structure). The application for the easement has been referred to the General Services Administration (the agency having jurisdiction over the Fort Stanton lands).

The program being carried out on National Forest lands by the Forest Service is about one-third completed. To June 30, 1955 some 459 stabilization and sediment control structures, 28 miles of roadside erosion control, 745 acres of contour furrowing and pitting, 4,665 acres of gully control, 125 acres of rangeland seeded, etc., are some of the major works which have been finished in connection with improved grass management program in the watershed.

NEW YORK

Ball Creek

Total Estimated Federal Cost \$78,000
Total Obligations through June 30, 1955 \$17,002

The one floodwater retarding structure and the 1.2 miles of stream channel improvement planned in this watershed will be installed during the fiscal year 1956. During the past fiscal year technical services were furnished by the Forest Service and the Soil Conservation Service in planting 213 acres of seedlings, and forest management and woodland protection to 4,159 acres of woodlands. The New York State Conservation Department furnished supervision over all the forestry work and supplied the planting stock for reforestation under the provisions of the New York State Forest Practice Act.

Dean Creek

Total Estimated Federal Cost	\$115,000
Total Obligations through June 30, 1955	\$114,255

The major works of improvement planned for this watershed are two floodwater retarding structures, eleven debris basins, and 2.9 miles of stream channel improvement. As of June 30, 1955, the two floodwater retarding structures, the stream channel improvement, and eight debris basins had been completed.

Great Brook

Total Estimated Federal Cost	\$102,000
Total Obligations through June 30, 1955	\$ 32,759

Enthusiasm for the project continues high among the watershed association, and the "Great Brook Conservation Field Day" held annually in August is well attended by local people and outsiders. The Forest Service in cooperation with the New York State Conservation Department has furnished considerable forest management assistance. The Conservation Department has furnished supervision over all the forestry work and has supplied planting stock for reforestation under the New York State Forest Practice Act. Installation of the floodwater retarding structure has been delayed by easement difficulties but farm planning is still about on schedule. Upland application is progressing but has fallen a little behind schedule due to the low income of many landowners in the watershed.

Little Hoosic

Total Estimated Federal Cost	\$469,000
Total Obligations through June 30, 1955	\$ 38,033

The work plan has been revised to include a total of 14.9 miles of streambank and channel stabilization and 14 debris basins and grade control structures. Due to this revision construction work is scheduled to start in fiscal year 1956 and local people have obtained most of the easements needed. Upland work is still behind schedule. The Forest Service in cooperation with the New York State Conservation Department has furnished considerable forest management assistance. The Conservation Department has furnished supervision of all the forestry work and has supplied planting stock for reforestation under the New York State Forest Practice Act.

NORTH CAROLINA

Third Creek

Total Estimated Federal Cost	\$570,000
Total Obligations through June 30, 1955	\$186,381

The major works of improvement planned for this watershed include 11 floodwater retarding structures and 4.3 miles of stream channel improvement. By June 30, 1955, one floodwater retarding structure has been completed, and construction has begun on a second one and one contract has been let for 4.6 miles of stream channel improvement, of which three-fourths had been completed. Revegetation with grasses and legumes on galled and gullied silt-producing areas had been established on 127 acres of land. The Forest Service has furnished assistance in planting seedlings on 73 acres of badly eroded land. Fencing to prevent woodland grazing damage has been installed to give protection to 80 acres of critical sediment producing area. Technical forestry assistance has been furnished to owners for marking and harvesting timber on 20 acres.

About 8 miles of erosion control has been completed along highways by bank sloping and seeding by the North Carolina State Highway and Public Works Commission at its expense. The North Carolina Division of Forestry has supplied, free of charge, over 130,000 pine seedlings for planting on the watershed. The State has also furnished technical forest management assistance to several landowners during the past year.

NORTH DAKOTA

Tongue River

Total Estimated Federal Cost	\$2,661,000
Total Obligations through June 30, 1955	\$ 230,853

The major works of improvement planned for this watershed by the Soil Conservation Service are 18 floodwater retarding structures, 5 miles of waterway improvement, 30 miles of stream channel capacity improvement and 31-1/2 miles of floodway. The Forest Service in cooperation with the State Forester has planned 102 acres of tree planting and 198 acres of revegetation of critical areas. Channel improvement in the amount of 8.8 miles has been completed. Two floodwater retarding structures are under construction. Five additional floodwater retarding structures are planned for construction during the fiscal year 1956. The land treatment measures are being accelerated through the activities of the Soil Conservation Districts. Good progress is being made in pond construction, pasture improvement, revegetation of critical areas, and tree planting.

A significant item on the Tongue River Watershed Protection Project is the excellent cooperation of local people and non-federal organizations. This cooperation and willingness of the local people to participate in the program is revealed by the fact that the sponsoring agencies have been able to secure easements and rights-of-way at little or no cost for the channel improvement projects under construction or planned for 1956. In addition more than fifty percent of the lands above the structures are under conservation agreements.

OHIO

Rocky Fork - Clear Creek

Total Estimated Federal Cost	\$263,000
Total Obligations through June 30, 1955	\$ 51,467

The major works of improvement planned for this watershed are 19 stabilization and sediment control structures, 27 miles of waterway improvement, 2.7 miles of diversion ditches and dikes, 3 miles of stream channel improvement, 2-1/2 miles of roadside erosion control, and revegetation of 70 acres of critical sediment-producing area. Measures completed are 4.2 miles of subwatershed waterways, 3.1 miles of diversion ditches and 2.1 acres of critical sediment producing area stabilized.

Upper Hocking

Total Estimated Federal Cost	\$703,000
Total Obligations through June 30, 1955	\$246,777

The major works of improvement planned for this watershed are 9 floodwater retarding structures, 72 stabilization and sediment control structures, 24.2 miles of waterway improvement, and 5.3 miles of stream channel improvement. Two floodwater retarding structures have been completed. Bids were opened on July 8 for contracts covering construction of 7 of the small drop inlet desilting and stabilization structures.

Of the 31,418 acres in the project, 27,770 are in farms and 13,794 acres are included in basic farm plans. Land treatment measures on the 13,794 acres include 8,512 acres of land use adjustment, 994 acres of strip cropping, 2,433 acres of pasture seeding, 15.5 acres of wildlife plantings, and 81 acres of tree planting.

The Forest Service, working through the State Forester, has supervised the installation of tree planting, and has furnished technical assistance to the owners of 50 acres of timberland to insure harvesting the timber without damage to watershed values. Forest fire protection under the joint effort of the Forest Service, State Forester, and local town fire departments, is being intensified in the watershed.

OKLAHOMA

Double Creek

Total Estimated Federal Cost	\$359,000
Total Obligations through June 30, 1955	\$317,826

The major works of improvement planned for this watershed are six flood-water retarding structures. Four of these have been completed and two are under contract for construction in the fiscal year 1956. About 25% of the land treatment program has been applied.

The Philips Petroleum Company and the Kansas-Oklahoma Caney Watershed Council have conducted educational tours and regular monthly educational meetings over a period of two years to advance the project. The Soil Conservation District members have contributed time and travel expenses in promoting the project. The Philips Petroleum Company contributed drafting and map reproduction services, photographic, and legal services. Local interests purchased four tracts valued at \$28,400.00 in order to get necessary easements. Local landowners provided easements for all other sites in accordance with the work plan.

PENNSYLVANIA

Corey Creek

Total Estimated Federal Cost	\$104,000
Total Obligations through June 30, 1955	\$ 45,551

There are no structural measures planned for the Corey Creek Watershed. The land treatment program has received the wholehearted support of the various local and State agencies.

Through the small watershed group approach the leaders on the watershed were brought together by the district board of directors and a full scale interest in a watershed for Corey Creek was developed. Slightly more than a year ago the Corey Creek Watershed Association was formally organized. The boards of directors of the district and association have worked together with both rural and urban people and organizations. The U. S. Forest Service has provided technical assistance through the Pennsylvania Department of Forests and Waters in making woodland studies and developing individual woodland planning.

The work plan emphasized the need for getting water disposal systems installed first and then proceeding with the installation of the other practices, such as strip cropping, rotations, lime and fertilizer treatments, contouring and establishment of permanent grass. Accordingly, emphasis was placed on developing diversion construction during the past fiscal year.

To date there have been established 19.8 miles of diversions, 7.2 acres of grassed waterways, 93 acres of strip cropping, 4 acres of perennial hay, 36 acres of pasture planting, 5,516 acres of farm planning and application, 49.3 acres of tree planting, and 1,308 acres of forest management assistance.

Jack's Run

This project has not been authorized due to the fact that no qualified local agency was willing to sponsor it.

SOUTH CAROLINA

Twelve Mile Creek

Total Estimated Federal Cost	\$805,000
Total Obligations through June 30, 1955	\$201,399

The major works of improvement planned for this watershed are 11 floodwater retarding structures, 27 miles of stream channel improvement, revegetation of 4,170 acres of critical sediment-producing area, 100 miles of roadside erosion control, five miles of diversion ditches and dikes, and 6,375 acres of tree planting on critical sediment producing areas.

One floodwater retarding structure has been installed and one is under construction. Stream channel improvement has been accomplished on about 5-1/2 miles of a stream channel. Six and one-half miles of roadside erosion control, and 255 acres in grass and legumes and 130 acres in trees have been established for the stabilization of critical runoff and sediment producing areas. The State Forester is cooperating with the Forest Service in providing technical assistance for tree planting and for harvesting timber without impairing watershed values.

SOUTH DAKOTA

Scott Creek

Total Estimated Federal Cost	\$130,000
Total Obligations through June 30, 1955	\$113,210

The major works of improvement planned for this watershed are 2 floodwater retarding structures, 7 stabilization structures, and 2.3 miles of stream channel improvement. Two floodwater retarding structures have been constructed and the 7 stabilizing structures are under construction. It is expected that they will be completed in fiscal year 1956.

Application of land treatment measures has progressed proportionately with the installation of structural measures in this watershed and it is expected that a good balance will have been achieved by the time the structures are completed this fall. The local people, the sponsoring agency, and the steering committee are all very enthusiastic about the project and progress thus far. The progress is being watched by interested groups in the surrounding area. Numerous tours have been conducted over the project for the purpose of explaining the objectives and discussing the work.

TENNESSEE

Wolf River Tributaries

Total Estimated Federal Cost	\$411,000
Total Obligations through June 30, 1955	\$155,025

The major works of improvement planned for this watershed include 12 floodwater retarding structures, 49 stabilization structures, 14.5 miles of stream channel improvement, 10 miles of roadside erosion control, 1,166 acres of revegetation of critical sediment producing areas. One floodwater retarding structure and 49 stabilization dams have been constructed. The Fayette Soil Conservation District, a sportsmens club, a banker, and a state commission have worked together as a group to purchase the necessary lands for a second floodwater retarding structure which will combine recreational facilities as a part of the plan for the flood reservoir. It is expected that construction of this structure will get under way in 1956. The State Game and Fish Commission is planning to purchase 350 acres of land in connection with this structure, part of which will be used for a park. The commission also will assume full responsibility for maintenance of the completed works of improvement and will pay for the added costs of construction incident to the recreational features of the project.

A total of 61 farmers representing 55 percent of the landowners in the watershed are now soil conservation district cooperators. Land treatment measures installed include 799 acres of trees and 166 acres of kudzu on severe sediment producing areas.

TEXAS

Calaveras Creek

Total Estimated Federal Cost	\$380,000
Total Obligations through June 30, 1955	\$236,077

The major works of improvement planned for this watershed are 10 floodwater retarding structures. Four of these structures have been completed and one is now under construction. The San Antonio River Authority has assumed responsibility for obtaining all easements for reservoir sites in this watershed. Steps are being taken at this time to obtain easements on the

those sites which are not clear. Establishment of land treatment on this watershed has progressed slowly due to the drought which has prevailed over the state.

The San Antonio River Authority has provided a fund for maintenance work on sites in the Calaveras Watershed. One hundred dollars per structure per year is being placed in the maintenance fund.

On June 16, 1955 the San Antonio River Authority sponsored a field trip for local people who were interested in seeing projects in the Calaveras Watershed which were completed. This tour was planned with a program giving information on the flood prevention program, following a lunch served by the sponsoring organization .

Cow Bayou Creek

Total Estimated Federal Cost	\$743,000
Total Obligations through June 30, 1955	\$191,380

The major works of improvement planned for this watershed are 11 floodwater retarding structures and 2.6 miles of stream channel improvement. Two structures are completed and one is now under construction. Easements are clear on two additional sites and progress is being made on clearing the remainder. Interest has been very good among local people in these sites. The extended drought over the state has delayed progress in establishing land treatment practices.

Escondido Creek

Total Estimated Federal Cost	\$666,000
Total Obligations through June 30, 1955	\$353,687

The major works of improvement planned for this watershed are 11 floodwater retarding structures. Four of these structures are complete and two others are under construction. Land easements for all structures except one are clear for this watershed, and one utility easement remains to be cleared. There has been excellent interest from local people during the construction of the structures. The extended drought which has occurred over this area has retarded establishment of land treatment practices.

The San Antonio River Authority has provided a fund for maintenance work on sites in the Escondido watershed. One hundred dollars per structure per year is being placed in the maintenance fund.

Green Creek

Total Estimated Federal Cost\$1,036,000
Total Obligations through June 30, 1955 \$360,625

The major works of improvement planned for this watershed are 13 floodwater retarding structures. Three structures have been completed and three are under construction. Easements have been cleared on all structure sites in the watershed and the local leaders are now actively engaged in expediting the establishment of land treatment measures which contribute to flood prevention. Progress on installation of such measures has been slower than originally scheduled due to continued drought.

UTAH

Pleasant Creek

Total Estimated Federal Cost \$327,000
Total Obligations through June 30, 1955 \$111,614

The major works of improvement planned on private land in this watershed are 15 stabilization and sediment control structures, 6.5 miles of stream channel improvement, 11.6 miles of roadside erosion control, and stabilization of 100 acres of critical runoff and sediment producing areas. The Forest Service has planned 8 miles of roadside erosion control, 250 acres of revegetation of critical areas, 1,400 acres of special purpose terraces and .7 mile of gully stabilization on national forest land.

Five stabilization structures and 2 miles of stream channel improvement have been completed. Plans are completed for 7 additional structures and 7,000 feet of channel improvement. The Forest Service has completed 8.1 miles of roadside erosion control, 78 acres of revegetation, constructed 320 acres of special purpose terraces, and 4.5 miles of fences on national forest land.

The cooperation and work of the supervisors of the Sanpete County Soil Conservation District, the members of the Watershed Protection Committee and interested citizens has been extremely gratifying in this project. The committee has done exceptionally well in working out cost sharing agreements with local, State and county agencies and in obtaining approving signatures on the work plan. Because of the work of the Sanpete County Soil Conservation District Supervisors and the well organized watershed committee activity and persistent attention to work plan participation, sizable contributions totaling approximately \$20,000 were obtained from the Denver and Rio Grande Railway, State Highway Department, and County Commissioners. The committee has been very diligent in obtaining easements and rights-of-way for planned work so that at the present time, easements have been obtained on all areas of the project except a section of channel. The cost sharing by local, State, and county interests is well over the minimum figures set up in the schedule of costs in the work plan.

Santaquin

Total Estimated Federal Cost	\$92,000
Total Obligations through June 30, 1955	\$78,875

The major works of improvement planned for this watershed by the Soil Conservation Service are 1 desilting and debris basin, 1.2 miles of stream channel improvement, and 1 mile of floodway. The Forest Service has planned 1 mile of stream channel improvement, 1-1/2 mile of roadside erosion control, the revegetation of 503 acres of critical sediment producing areas, and 312 acres of special purpose terraces.

The desilting basin has been completed and preliminary plans are prepared for diversion dikes and stream channel improvements. The Forest Service has installed 1-1/2 mile of roadside erosion control, 412 acres of revegetation in critical areas, and 312 acres of special purpose terraces. Cattlemen, who hold 29 permits for grazing cattle in the Upper Santaquin Watershed, have contributed to its improvement by voluntarily removing their cattle for a 3 year period in order to permit improvement in soil and vegetation.

Members of the Nebo Soil Conservation District Board and members of the Santaquin Watershed Protection Committee have contributed considerable time to promote the project. Two-fifths of the total pledged money contribution was contributed by four different interested groups during the fiscal year. Santaquin City has contributed nearly four-fifths of their commitment to the project.

VIRGINIAEast Fork Falling River

Total Estimated Federal Cost	\$233,000
Total Obligations through June 30, 1955	\$ 71,297

The major works of improvement planned for this watershed are 3 floodwater retarding structures, 15 miles of stream channel improvement, 4.4 miles of waterway improvement, 41 acres of roadbank stabilization and the stabilization of 954 acres of critical runoff and sediment producing areas of which 432 acres are woody plantings planned by the Forest Service.

As of June 30, 1955, 1.6 miles of subwatershed waterways, 20 miles of road-bank stabilization, 1.7 miles of roadwater runoff control, 32 acres of gullied and galled area stabilization, 43 acres of grasses and legumes and 174 acres of tree planting had been installed in the watershed. The Forest Service in cooperation with the Virginia State Forest Service, has planted the trees on one hundred twenty-three acres of critical sediment producing

areas during the past season and also furnished technical assistance for an additional 222 acres planted by local farmers.

The first floodwater retarding structure is scheduled for construction in the fiscal year 1956.

A large pulpwood company has purchased considerable land in the watershed for the purpose of growing trees. This company is planting trees on all open land purchased. They have their own foresters. It is planned to complete District agreements on these tracts and include them in the list of District Cooperators.

WASHINGTON

Mission Creek

Total Estimated Federal Cost	\$348,000
Total Obligations through June 30, 1955	\$125,780

The major works of improvement planned for the Mission Creek Project are two miles of stream channel improvement on private land, four miles of channel improvement and 625 acres of critical area stabilization on National Forest Land. About 1,000 feet of stream channel improvement has been completed on private land. The stream channel improvement planned by the Forest Service is about 75% complete. The Forest Service has installed 3 miles of livestock drift fence, 2 cattle guards, 11 miles of stock driveway, and 9 miles of special all-purpose trails in the National Forest portion of the watershed.

There has been some difficulty in implementing the program in this watershed due to a strong minority opinion that the Federal and State Governments will finance the total construction program. Action has been taken by local people to organize a Flood Control District. It is hoped that this District will provide the necessary local cooperation to install the work planned for private lands. In the meantime, work is continuing on the National Forest Lands since they comprise the headwaters and will be beneficial on site, as well as downstream, irrespective of final accomplishments on downstream private lands.

Spring Valley Creek

Total Obligations through June 30, 1955	\$4,293
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Authorization for this project was withdrawn at the request of the sponsors effective May 1954.

WEST VIRGINIA

Salem Fork

Total Estimated Federal Cost \$261,000
Total Obligations through June 30, 1955 \$149,506

The major works of improvement planned for this watershed include 8 floodwater retarding structures, 2 miles of stream channel improvement, 4 miles of roadbank erosion control, and 100 acres of revegetation of critical sediment producing areas. Two floodwater retarding structures have been completed and two additional are scheduled for construction in 1956. About \$9,000 has been contributed by a state agency to pay for the costs of a road relocation job incident to the construction of one floodwater retarding structure. Approximately 160,000 tree seedlings were planted in the watershed area in the spring of 1955. Rainfall measurement and streamflow instruments have been installed in this watershed to determine the effectiveness of the conservation treatment program being applied in the watershed.

WISCONSIN

West Fork of the Kickapoo

Total Estimated Federal Cost \$249,000
Total Obligations through June 30, 1955 \$114,295

The major works of improvement planned for the West Fork of the Kickapoo are three floodwater retarding structures, three stabilizing and sediment control structures, 10 miles of sub-watershed waterway improvement, four miles of diversions, and 40 acres of woody plantings planned by the Forest Service for stabilization of critical runoff and sediment producing areas. Construction work on two floodwater retarding structures has been delayed because of default on the part of the contractor. Two stabilizing structures are planned for installation in fiscal year 1956.

The Forest Service, in cooperation with the Wisconsin Department of Conservation, provided technical services to the owners of about 500 acres of timberland so that the timber could be harvested without impairment of watershed values.

(c) Flood Prevention

Appropriation Act, 1956 and base for 1957	\$10,000,000
Budget Estimate, 1957	10,700,000
Increase (to accelerate the installation of flood prevention works of improvement and conservation land treatment measures in the eleven watersheds authorized by the Flood Control Act of 1944)	<u>+700,000</u>

PROJECT STATEMENT

Project	1955	1956 :(estimated):	Increase	1957 :(estimated)
1. Preliminary examinations and surveys	\$81,892	- -	- -	- -
2. Works of improvement	7,037,375	\$10,000,000	+\$700,000(1)	\$10,700,000
3. General basin investigations	239,453	- -	- -	- -
Total pay act costs (P.L. 94)	[54,677]	[283,000]	[-7,000]	[276,000]
Total	<u>\$7,358,720</u>	<u>\$10,000,000</u>	<u>+700,000</u>	<u>10,700,000</u>
1955 appropriation available in 1956	+1,707,997	- -		
Transfer in 1956 estimates from other accounts	-1,584,717	- -		
Total appropriation or estimate	<u>7,482,000</u>	<u>10,000,000</u>		

a/ In addition, \$2,040,676 was available from prior year balance.

b/ In addition, the following unobligated balances from the prior year are available:

	1956
a. Preliminary examinations and surveys	\$95,159
b. Works of improvement	1,552,290
c. General basin investigations	60,548
Total	<u>1,707,997</u>

INCREASE

(1) An increase of \$700,000 to accelerate the installation of flood prevention works of improvement and conservation land treatment measures in the eleven watersheds authorized by the Flood Control Act of 1944.

Need for Increase and Plan of Work: The watershed improvement measures being installed in each of the eleven authorized flood prevention watersheds are installed on a cost-sharing basis with local landowners and interested organizations. They furnish all easements and rights-of-way for the structural works of improvement and part of the construction costs. With technical assistance from the Service they also install the land treatment measures in the farm areas above the structures that are necessary to retard waterflow to protect the structures and downstream areas from sedimentation. Responsibility for maintenance and protection of the completed works of improvement is assumed by the local interests. Work on many of the projects is not being carried on as rapidly as originally planned and as necessary to prevent serious damage to valuable agricultural land and sedimentation of downstream dams and reservoirs. In many sub-watersheds the Department has already developed work plans and designs for required works of improvement and the local people have secured necessary easements and rights-of-way and have furnished assurance of cost-sharing and maintenance arrangements for structural measures to be constructed. However, sufficient funds are not available to meet the Federal share of the construction costs. It is proposed to speed up the installation of watershed works of improvement in those sub-watersheds where the local interests have indicated a willingness and readiness to proceed. The increase requested would be used to finance the Federal cost of the flood prevention works of improvement to be installed in these sub-watersheds by local contractors and provide necessary engineering supervision over the construction work.

The following statement reflects the funds available for 1956 and the proposed appropriation, 1957 for work on the eleven authorized watersheds:

FLOOD PREVENTION

Works of Improvement
Funds Available 1956, and Proposed Appropriation 1957

Watershed	1956 Availability			1957 Budget
	Total Available	Balances carried forward from 1955	1956 Appropriation	Estimate (New Appropriation in Addition, Prior Year Balances Available)
(1)	(2)	(3)	(4)	(5)
Buffalo Creek, New York	\$364,499	\$37,629	\$326,870	\$292,170
Colorado (Middle), Texas ...	876,042	16,205	859,837	1,207,130
Coosa, Ga., Tenn.	396,048	5,861	390,187	499,880
Little Sioux, Iowa	1,067,091	261,280	805,811	589,290
Little Tallahatchie, Miss. .	1,003,110	299,304	703,806	768,880
Los Angeles, California	1,130,820	233,249	897,571	803,710
Potomac, Md., Pa., Va., W.Va.	457,398	109,598	347,800	439,660
Santa Ynez, California	83,457	13,957	69,500	96,610
Trinity, Texas	2,316,686	22,972	2,293,714	2,231,160
Washita, Oklahoma	1,886,854	169,931	1,716,923	2,119,040
Yazoo, Miss.	1,970,285	382,304	1,587,981	1,652,470
Total	11,552,290	1,552,290	10,000,000	10,700,000 ^{a/}

^{a/} Includes \$300,000 for emergencies. Under authority of Section 216 of the Flood Control Act of 1950, not to exceed \$300,000 may be expended each fiscal year for emergency measures when a fire or any other natural element or force has caused a sudden impairment of the watershed. This amount is withheld from the allotments to the various watersheds at the beginning of each year on a proportionate basis. Such amounts as are not needed for emergency measures are redistributed, also on a proportionate basis, to these watersheds toward the end of the fiscal year for use therein.

CHANGES IN LANGUAGE

The estimates include proposed changes in the language of this item as follows (deleted matter enclosed in brackets; new language underscored):

- For expenses necessary, in accordance with the Flood Control
- 1 Act, approved June 22, 1936 ([Public Law 738]) 33 U.S.C.
701-709, as amended and supplemented, ***
 - 2 1: Provided further, That hereafter the funds appropriated for flood prevention purposes may be expended in watersheds heretofore authorized by section 13 of the Flood Control Act of December 22, 1944, as amended, for necessary measures for the prevention of erosion, floodwater, and sediment damages, including gully control, floodwater detention, and floodway structures, in areas other than those over which the Department of the Army has jurisdiction and responsibility].

The first change in language is to substitute reference to the United States Code in lieu of the Public Law reference previously shown in the appropriation language.

The second change in language proposes to eliminate the last proviso of this item relating to the use of these funds in the eleven authorized watersheds for necessary measures for prevention of erosion, floodwater, and sediment damages in areas other than those over which the Department of the Army has jurisdiction and responsibility. This proviso as included in the 1956 appropriation act is permanent legislation and it is, therefore, not necessary to include it in the annual appropriation act. Deletion of this language will not affect in any way the nature and scope of the work conducted under this appropriation.

STATUS OF PROGRAM

PRELIMINARY EXAMINATIONS AND SURVEYS

Status of Review Surveys

Except for necessary review surveys on six of the eleven watersheds in which the Department is permitted by Section 7 of the Watershed Protection and Flood Prevention Act to continue to prosecute works of improvement for flood prevention, all survey work conducted by the Department under authority of the Flood Control Act of 1936, as amended and supplemented, was discontinued after enactment of Public Law 566, 83d Congress. As of June 30, 1955, the field work and survey reports had been completed for three of the six watersheds in which review surveys were in progress during the 1955 fiscal year. There is still some field work to be done in the Little Sioux, Little Tallahatchie and Yazoo watersheds before the writing of the review survey reports can be completed. This work is expected to be finished by April 1, 1956.

Review survey reports previously completed for the Trinity River watershed in Texas and the Coosa River watershed in Georgia were revised during the year. The original authorizations for these two review surveys contemplated extending the area of the approved watersheds to cover additional lands and the review survey reports had been prepared to include data pertaining to these additional areas. However, Public Law 566, 83d Congress limited the Department's authority to carry out Flood Prevention work to the authority contained in the Flood Control Act of 1944, approved December 22, 1944. The latter did not include these additional areas so it was necessary to revise the review survey reports.

Agency Participation

Funds available for Preliminary Examinations and Surveys have been allocated to the cooperating agencies in the Department as follows:

Agency	: 1955 : Obligations	: 1956 : Estimate	: 1957 : Estimate
Soil Conservation Service	: \$174,551	: \$70,267	: --
Forest Service	: 45,488	: 24,892	: --
Total	: 220,039	: 95,159 ^{1/2}	: --

1/ Any balance remaining unobligated when the work has been completed will be recommended for transfer to "Works of Improvement".

WORKS OF IMPROVEMENT

Current Activities:

The Flood Control Acts provide for the reduction of floodwater, sediment, and erosion damages and the prevention of floods by watershed improvement measures for which the Department of Agriculture is responsible and for control of floods by main-stream control works for which the Department of the Army is responsible. The work of the Department under this item is carried on in the eleven watersheds authorized by the Flood Control Act of 1944, and consists of (a) the preparation of detailed sub-watershed or functional work plans which specify the kind of improvements to be installed for flood prevention, their location, and the work schedule, (b) the installation of works of improvement, such as diversions, dikes, gully-stabilizing and water-retarding structures, debris and desilting basins, floodways, stream-channel improvement, fire protection and woodland improvement measures, etc., to reduce flood, erosion, and sediment damage and retard runoff and control its movement into the main streams, and (c) the acceleration of land treatment measures to prevent erosion and protect the structural works of improvement from flood and sediment damage. Proposed improvements by the Department are correlated with and designed to protect mainstream work by the Corps of Engineers, the Bureau of Reclamation, and others, in addition to providing protection to the watershed lands and property above the mainstream works.

Program Assignments

The Soil Conservation Service has general responsibility for administration of the work of the Department authorized under the Flood Control Acts. The Soil Conservation Service and the Forest Service carry out the planning and installation of flood prevention works of improvement in the authorized watersheds. Division of responsibility is in accordance with their respective specialist fields. The Forest Service activities are concerned with (a) all national forests and other lands in the authorized watershed that are administered by the Forest Service, (b) all range areas adjacent to national forests in the watershed and used in conjunction with such forests, and (c) other forest land within the watersheds. The Soil Conservation Service activities are concerned with all other private and public lands in the watersheds.

Maintenance Responsibilities

The proper and continued maintenance of installed measures is the key to the long-time effectiveness of the watershed improvement programs. Land owners and operators generally maintain conservation and other measures which benefit primarily the lands upon which they are installed. Local units of Government generally maintain the measures which provide primarily off-site benefits.

Examples of Recent progress:

Allocation of Funds for Works of Improvement

Funds available for planning and installation of flood prevention works of improvement are allocated between the Soil Conservation Service and the Forest Service as follows:

Agency	1955 Obligations	1956 Funds Available	1957 Estimate
Soil Conservation Service	\$7,639,463	\$10,390,845	\$9,469,500
Forest Service	1,277,343	1,251,455	1,230,500
Total	8,916,806	11,552,290	10,700,000

The following table provides a breakdown by watersheds of the allocations for 1956 and 1957 shown above:

Watershed	1956 Funds Available			1957 Budget Estimate		
	Agency Distribution			Agency Distribution		
	SCS	FS	Total	SCS	FS	Total
1. Buffalo Creek, N. Y.	\$363,049	\$1,450	\$364,499	\$288,480	\$3,690	\$292,170
2. Colorado (Middle); Texas ..	876,042	- -	876,042	1,207,130	- -	1,207,130
3. Coosa, Ga., Tenn	389,948	6,100	396,048	474,040	25,840	499,880
4. Little Sioux, Iowa, Minn....	1,067,091	- -	1,067,091	589,290	- -	589,290
5. Little Tallahatchie, Miss..	822,971	233,139	1,056,110	597,840	171,040	768,880
6. Los Angeles, California ..	547,081	583,739	1,130,820	291,820	511,890	803,710
7. Potomac, Md., Pa., Va., W. Va. ..	433,204	24,194	457,398	408,900	30,760	439,660
8. Santa Ynez, California ..	33,553	49,904	83,457	9,240	87,370	96,610
9. Trinity, Tex..	2,316,686	- -	2,316,686	2,231,160	- -	2,231,160
10. Washita, Okla..	1,886,854	- -	1,886,854	2,119,040	- -	2,119,040
11. Yazoo, Miss..	1,564,356	352,929	1,917,285	1,252,560	399,910	1,652,470
12. Emergencies a/..	- -	- -	- -	- -	- -	- -
Total ...	10,300,835	1,251,455	11,552,290	9,469,500	1,230,500	10,700,000

a/ Under authority of Section 216 of the Flood Control Act of 1950, not to exceed \$300,000 may be expended each fiscal year for emergency measures.

when a fire or any other natural element or force has caused a sudden impairment of the watershed. This amount is withheld from the allotments to the various watersheds at the beginning of each year. Such amounts as are not needed for emergency measures are redistributed to these watersheds toward the end of the fiscal year for use therein.

Watershed Work Plans and Improvement Measures

The Department, in cooperation with soil conservation districts, watershed organizations and other local, private, and public agencies, is planning and installing watershed improvement measures in all eleven of the authorized watersheds. As of June 30, 1955 work plans had been developed for approximately 13,759,840 acres or about 46 percent of the 30,102,774 acres in the authorized portion of the watersheds.

The following table lists some of the major watershed works of improvement which have been installed or were in the process of installation cooperatively by the Department agencies and local cooperators in 1955, and those planned to be installed in 1956 and 1957:

Type of Improvement	Unit	1955 Actual	1956 Estimate	1957 Estimate
1. Floodwater retarding structures	Number	71	108	220
2. Stabilization and sediment control structures:				
(a) Structures	Number	918	371	403
(b) Debris and desilting basins ..	Number	4	1,005	10
(c) Detention terraces	Mile	--	106	84
3. Subwatershed waterway improvement	Mile	1	8	33
4. Stream channel improvement	Mile	159	191	152
5. Diversion ditches and dikes	Mile	71	118	214
6. Floodways (channel excavation)	Mile	--	--	3
7. Stabilization of critical runoff and sediment producing areas:				
(a) Roadside erosion control	Mile	396	350	283
(b) Revegetation:				
(1) Grasses and legumes	Acres	8,401	3,050	23,147
(2) Woody plantings	Acres	44,339	31,670	39,795
8. Fire protection:				
(a) Fire control trails and breaks ..	Mile	204	10	33
(b) Structures	Number	14	8	44
(c) Heliports and heliospots	Number	174		1
(d) Mobile equipment	Number	18	16	16
9. Communication facilities:				
(a) Permanent radio installation	Number	13	10	--
(b) Telephone lines	Mile	89	--	--

Participation of Local People and Organizations

The establishment and maintenance of the flood prevention measures planned for each watershed are dependent upon the financial ability and willingness of the local people to assume their share of the responsibility for the works of improvement to be installed. This includes cooperation and participation in the planning, installation of the land treatment measures, securing of all easements and rights-of-way for the structures to be installed, sharing of costs in some cases for the major works of improvement, and assumption of full responsibility for the maintenance of the improvements installed.

The following are examples of local cooperation:

1. In the Trinity River watershed in Texas a complete land treatment program has been applied on nearly all lands of the Elm Fork tributary above Brushy Creek. Over 80 percent of the area draining into the three floodwater retarding structures installed in the Squabble Creek tributary is under cooperative agreement with the Kaufman-Van Zandt Soil Conservation District and about 75 percent of the planned practices have been applied. Several watershed associations have been formed with the objective of assisting the soil conservation districts in furthering the land treatment program. The local people in the Lower East Fork Laterals sub-watershed obtained all easements (126 in number) that were necessary to permit construction of the twelve floodwater retarding structures that were built. The value of these easements was \$122,700 of which \$30,000 was raised locally and paid to landowners whose lands would be damaged by the flood pool. The local people have also spent \$950,000 in the construction of river levees and a floodwater diversion.
2. In the Little Sioux watershed in Iowa the Little Sioux Works Committee, the District Commissioners, and the County ASC committee have worked diligently to promote the use of level terraces as a principal flood prevention measure in this watershed. Largely as a result of their efforts, approximately 600 miles of level terraces were installed during the 1954 calendar year compared with a cumulative total of 850 miles installed since 1946.
3. In the Potomac River watershed several groups have organized to promote and assist in the installation of flood prevention measures. The South River Land and Water Conservation Association has been formed to develop work plans and assist in the installation of a complete flood prevention program in the South River subwatershed. The Inter-district Potomac River Basin Committee was organized to coordinate the flood prevention programs being planned and installed in the Shenandoah Valley, Lord Fairfax, and Mountain Soil Conservation Districts. The City Council of Waynesboro has participated in the development of the work plan for the South River sub-watershed and is

furnishing the funds to maintain the one floodwater retarding structure that has been installed. The States of Maryland, Virginia and West Virginia are furnishing technical forestry assistance to the woodland owners in the watershed.

Demonstrated Effectiveness of Works of Improvement

The storm of May 17-19, 1955 on the Deep Creek subwatershed of the Middle Colorado River watershed in Texas demonstrated the effectiveness of watershed improvement measures in reducing flood damages. A maximum of 9.22 inches of rainfall was measured for the 30-hour period of the storm at one of the many gages throughout the Deep Creek watershed, and the maximum intensity recorded was 0.8 inch for a 5-minute period. The weighted rainfall for the entire subwatershed was 7.78 inches. Approximately 950 acres of the 3,900 acres in the flood plain, of which about 44 percent is cropland, were flooded as a result of this storm. Without the watershed improvement measures it is estimated 3,050 acres would have been flooded. About 360 acres of the flood plain were damaged moderately by scouring. It is estimated that the floodwater retarding structures reduced this damage by 70 percent and that without the structures 1,220 acres would have been severely damaged. All structures functioned effectively and as planned.

During the spring of 1954 an intense rainstorm of short duration occurred on the Anthon subwatershed of the Little Sioux Watershed in Iowa. At that time the Flood Prevention program was only partially complete. The amount of water retained in the approximately 10 miles of level terraces and one detention reservoir which had been installed reduced the flood flow through the town of Anthon sufficiently that there was no flood damage. After the storm residents of Anthon reported that the watershed treatment measures had prevented serious damage to the town.

A major flood prevention factor in the Los Angeles Watershed is the system of fire control measures established to protect the brush and timber cover on the watershed. The intensified fire control measures installed and maintained on the national forest and State and private lands of the watershed in cooperation with the city of Los Angeles and Los Angeles county are providing that protection. Since 1949, when the first group of installations were nearing completion, the occurrence and size of fires within the watershed have been reduced significantly. Prior to 1953 the rate of burn per million acres protected had been reduced to 790 acres. A single fire occurred in the watershed in 1953 after the release of the special fire protection crews at the close of the normal season. This fire burned about 14,000 acres and as a result the rate of burn for the period 1949 to 1954 was 77,000 acres per million acres protected while in the adjoining national forest area the rate of burn was 189,500 acres.

Emergency Measures

Pursuant to the authority contained in Section 216 of the Flood Control Act of 1950, emergency treatment was undertaken to prevent serious sediment and

debris damage to residential areas, public water supplies, main transportation and communication facilities, and public utilities, as well as possible loss of life, in seven areas damaged by fire or floods in the 1955 fiscal year. Emergency seeding of fire denuded steep mountain slopes to rapid germinating mustard, ryegrass, orchard grass, or other grasses or grass mixtures, mostly by airplane or helicopter, provided immediate protective cover over the burned areas to reduce potential debris or sediment damage in the event of sudden or prolonged rain. Six of the seven areas were located in California. A total of 18,000 acres of burned area were planted to these cover crops. Emergency diversion channels and debris basins were also installed where necessary.

As a result of the torrential rains accompanying the hurricanes in the fall of 1954, widespread damage occurred in the Garland Brook watershed in New Hampshire. Surface and gully erosion and channel scour in the watershed area deposited considerable quantities of debris and sediment into the water supply of Lancaster, New Hampshire. Its diversion works was completely destroyed and the main intake was choked with debris. About 70 percent of the drainage area for the water supply originates in the White Mountain National Forest. In order to prevent severe erosion in the Forest and to protect the water supply from increased sedimentation, stabilization of the public lands was accomplished by the construction of small check dams in gullies, removal of debris from tributary channels, and emergency seeding of severely eroded areas.

The amount obligated for the emergency treatment of these seven areas in the fiscal year 1955 was \$66,925.

GENERAL BASIN INVESTIGATIONS

Status of Basin Investigations

The Department has been participating with six other Federal departments and agencies and with the respective States concerned, in planning comprehensive resource development programs for the Arkansas-White-Red River and the New England-New York areas. All field work and the writing of the reports was completed by June 30, 1955. A copy of the reports has been furnished to all interested agencies and the States involved for review and comment. However, because of the rapidly expanding Watershed Protection activities and the need to assign personnel to that program, the final revision and reproduction of the reports remains to be completed, and this will be done in the near future.

Agency Participation

Funds provided specifically for General Basin Investigations in the Department are allocated as follows:

Agency	: 1955 : Obligations	: 1956 : Estimate	: 1957 : Estimate
Soil Conservation Service	: \$219,972	: \$57,117	: --
Forest Service	: 18,890	: 3,431	: --
Agricultural Research Service	: 23,689	: --	: --
Total	: 262,551	: 60,548 1/:	: --

1/ Any balance remaining unobligated when the work has been completed will be recommended for transfer to "Works of Improvement".

REVISION OF PROJECT STRUCTURE

During the irrigation development stage of the several water conservation and utilization projects it has been customary to account for expenses incident to the management of the project lands, until the lands were sold to private operators as irrigation farms, through the use of a separate budgetary project. In the early years of the program, development of the lands for irrigation was progressing simultaneously on several projects and the amount of funds used for management purposes amounted to a fairly large sum each year. However, in the 1956 fiscal year the final sale of lands on all but one project will be completed. Because there is very little activity of this type remaining, it is considered uneconomical to require project personnel to maintain records that are necessary to distribute their time between the two budgetary projects involved and to maintain separate accounts in order to have accounting support for these projects.

It is proposed for the balance of the program, until the remaining farm units have been sold, that all work be accounted for under a single project. A comparison of the revised project structure with that reflected in the 1956 Budget, is as follows:

Project Structure in the 1956 Budget

1. Land development
2. Land management, settlement,
and technical guidance

Project Structure in the 1957 Estimates

1. Development of
land for irrigation

(d) Water Conservation and Utilization Projects

Appropriation Act, 1956	- -
Budget Estimate, 1957	\$232,000
Increase (to continue land leveling and other irrigation development work on the Eden Valley Project in Wyoming)	<u>+232,000</u>

NOTE: Although an increase of \$232,000 is requested in the appropriation for this item for 1957, it is estimated there will be a decrease of \$42,500 in total funds available due to the availability of prior year balances of \$474,500 in the fiscal year 1956, of which \$100,000 is proposed for use in the 1957 fiscal year.

PROJECT STATEMENT
(on an available fund basis)

Project	1955	1956 (estimated)	Increase or Decrease	1957 (estimated)
Development of lands for irrigation	\$330,455	\$374,500	-\$42,500(1)	\$332,000
Unobligated balance brought forward	-\$324,955	-\$474,500	+\$374,500	-\$100,000
Unobligated balance carried forward	+\$474,500	+\$100,000	-\$100,000	- -
Total pay act costs (P. L. 94)	[2,898]	[19,000]	[-2,000]	[17,000]
Total appropriation or estimate	\$480,000	- -	+\$232,000	\$232,000

DECREASE

(1) Decrease of \$42,500 in project and administrative expense due to completion in 1956 of the Angostura project in South Dakota.

All irrigation land development and subdivision work on the Angostura project in South Dakota was completed in the fiscal year 1955. Due to construction difficulties that the Bureau of Reclamation has had with the large siphon that is to convey irrigation water to project lands north of the Cheyenne River, water cannot be delivered to that portion of the project until the spring of 1956. During the 1956 fiscal year technical services are being provided to operators of farming units who have leased some of the land for the 1955 crop season. Other areas have been seeded to a cover crop to prevent damage from wind erosion. It is planned that all farm units on the project will be sold before the 1956 crop season and the project office closed by June 30, 1956.

The appropriation requested for fiscal year 1957, plus the unobligated balance carried forward from fiscal year 1956 will provide adequate funds to continue land leveling and other irrigation development work on the Eden Valley project in Wyoming.

CHANGE IN LANGUAGE

The estimates include the following new appropriation language for this item:

For expenses necessary to carry out the functions of the Department under the Acts of May 10, 1939 (53 Stat. 685,719), October 14, 1940 (16 U.S.C. 590y-z-10), as amended and supplemented, June 28, 1949 (63 Stat. 277), and September 6, 1950 (7 U.S.C. 1033-1039), relating to water conservation and utilization projects, to remain available until expended, \$232,000, which sum shall be merged with the unexpended balances of funds heretofore appropriated to said Department for the purpose of said Acts.

Sufficient unobligated balances from prior years were available from which to finance this program in the 1956 fiscal year. Therefore, the language for this item was deleted from the Department of Agriculture and Farm Credit Administration Appropriation Act in 1956. The entire appropriation language is being restored to provide for the appropriation requested for the 1957 fiscal year.

STATUS OF PROGRAM

Examples of Recent Progress:

Status of Project Development

Nineteen Water Conservation and Utilization projects were originally authorized for development under the 1940 Department of the Interior Appropriation Act and the "Case-Wheeler" Act of October 14, 1940, as amended. Eleven projects have been completed. The Angostura, South Dakota, project is scheduled for completion in 1956, and the Eden Valley, Wyoming, project is planned for completion in 1961. Development of the other six authorized projects is no longer planned due to inflationary land prices and other changes which have occurred since they were authorized.

Angostura Project, South Dakota

All land-leveling and sub-division work on the Angostura, South Dakota, project was completed in the fiscal year 1955. Due to a failure of the large siphon built to convey water to lands north of the Cheyenne River, irrigation water can not be delivered to this portion of the project until the Spring of 1956. Sale of all remaining farms is planned prior to the beginning of the 1956 crop year, and the project office will be closed by June 30, 1956. Technical services in farm planning and conservation operations will be provided through soil conservation districts, which include the project area, after the project has been completed.

Eden Valley Project, Wyoming

Land development for irrigation on the Government-owned land in this project was started in the spring of 1954. At that time there was before Congress a proposal to exchange certain of the Federal lands on this project with Public Domain lands held by the Department of Interior and also lands held by the State of Wyoming. After enactment of this legislation (Public Law 377, approved May 28, 1954) negotiations were begun with the Department of Interior and the State of Wyoming to arrange for the land exchanges. Final exchange of lands with the Department of Interior was completed in May 1955, and it is expected that final arrangements will be completed with the State of Wyoming in the 1956 fiscal year. These land exchanges have made it necessary to develop a new project pattern of irrigation farming units which would permit the available water supply to be applied to lands most suitable for irrigation development. However, it has delayed commencement of full scale land leveling operations and will now require that the completion date of all land development and final sale of farming units be extended into the fiscal year 1962. It is expected that sale of the first irrigation farming units will be made in the fiscal year 1957.

At the present time there is being prepared a revised cost estimate for the plan of work required to develop for irrigation purposes the farming units involved in the new project pattern. The present project authorization of \$1,529,000 was based on the lands included in the original project pattern and on engineering estimates prepared in 1948. Actual costs of operation and administrative expenses have increased greatly since the project authorization was originally approved.

Obligations by Projects

The following table shows, by project, the actual obligations incurred under this program in 1955 and estimated obligations for the fiscal years 1956 and 1957:

Project	Actual F.Y. 1955	Estimated F.Y. 1956	Estimated F.Y. 1957
Angostura, South Dakota	\$59,427	\$41,471	---
Eden Valley, Wyoming	221,018	287,171	\$287,200
Recovery of prior year obligations	- 207	--	--
Total Direct Project Costs ..	280,238	328,642	287,200
General Administration	50,753	45,858	44,800
Total Estimate	330,455	374,500	332,000

Development Accomplishments and Work Load

The following table shows some of the more important items of development work planned, the amount completed to date, and the amount remaining to be done:

Item	Unit	Total Development Planned	Accomplished to 6/30/55	Remaining to be done 7/1/55
Topographic surveys	Acre	163,541	161,478	2,063
Land classification	Acre	194,089	194,089	--
Unit subdivisions	No.	546	546	--
Clearing	Acre	30,814	26,379	4,435
Leveling	Acre	70,771	61,267	9,504
Farm laterals	Mile	1,480	821	659
Farm drains	Mile	596	422	174
Farm irrigation structures..	No.	9,092	7,811	1,281

Status of Land Development and Farm Sales
as of June 30, 1955

Project	:	:	:	:	: Federally-owned	
	Date	Irrigable	Percent	Development	tracts	c/
	Authorized	Acreage	Completed	Number	Total	Number
					Number	Sold
Angostura	March 6, 1941	12,154	95		105	90
Bitterroot	March 22, 1944	18,630	8 b/		-	-
Buffalo Rapids I	May 15, 1940	14,507	100		95	95
Buffalo Rapids II	May 15, 1940	10,400	100		110	110
Buford-Trenton	Sept. 23, 1939	14,729	100		134	134
Dodson a/	March 17, 1944	1,200	100		-	-
Eden Valley	Sept. 18, 1940	20,000	35		58	-
Intake a/	Jan. 20, 1944	825	99 b/		-	-
Mancos	Oct. 24, 1940	10,000	54 b/		2	2
Mirage Flats	March 30, 1940	12,000	100		111	111
Missoula a/	May 10, 1944	900	100		-	-
Newton a/	Oct. 17, 1940	2,225	100		-	-
Post Falls	Jan. 29, 1944	3,260	90 b/		17	17
Rapid Valley	Nov. 8, 1939	12,000	- b/		-	-
Scofield a/	May 24, 1943	12,500	30 b/		-	-

a/ Projects include no Federally-owned land.

b/ Projects closed, no further development work contemplated.

c/ In addition there are privately-owned lands within a number of projects on which development work is done.

Project Authorizations and Obligations through 6/30/55

Project	Obligations through June 30, 1955					Total
	Present					
	Project	"Wheeler-	"Great	Contri-		
	Authori-	Case"	Plains"	buted		
	zation	Funds	Funds	Funds		
Angostura.....	\$1,484,000:	\$1,380,417:	--	--		\$1,380,417
Balmorhea	569,000:	--	--	--		--
Bismarck	None	--	--	--		--
Bitterroot	752,000:	167,811:	--	--		167,811
Buffalo Rapids I .	743,770:	99,296:	\$210,000	\$424,175		733,471
Buffalo Rapids II .	810,122:	319,521:	345,000	139,608		804,129
Buford-Trenton ...	1,094,000:	62,798:	762,958	264,838		1,090,594
Dodson	84,000:	51,484:	--	--		51,484
Eden Valley	1,529,000:	604,957:	154,595	5,061		764,613
Intake	41,000:	20,817:	--	--		20,817
Mancos	473,000:	366,879:	--	--		366,879
Mann Creek	None	--	--	--		--
Mirage Flats	687,300:	479,152:	170,000	36,837		685,989
Missoula	133,000:	65,297:	--	--		65,297
Newton	75,500:	74,230:	--	--		74,230
Post Falls	196,000:	a/ 196,367:	--	--		a/ 196,367
Rapid Valley	170,000:	7,117:	15,042	--		22,159
Saco Divide	480,000:	--	405	--		405
Scofield	350,000:	119,531:	--	12,200		131,731
Total direct						
Project costs..	9,671,692:	4,015,674:	1,658,000	882,719		6,556,393
Project investiga-						
tions and surveys:	---	233,473:	--	--		233,473
General Adminis-						
tration:						
Farm Security ;						
Administration:	--	349,091:	--	--		349,091
Office of Pro-						
duction	--	4,137:	--	--		4,137
Office of the						
Solicitor	--	59,957:	--	--		59,957
Soil Conser-						
vation Service:	--	819,734:	--	--		819,734
Total Obligations						
through 6/30/55..	xxx	5,482,066:	1,658,000	882,719:		8,022,785

a/ Net obligations after deduction for residual value of equipment is \$186,545.

STATEMENT OF OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS

(Includes only those amounts which, by November 30, 1955, were actually received or programmed for 1956 or 1957. Since work for other agencies is performed on a service basis, at the request of those agencies and for their benefit, it is not practicable to estimate in advance the amounts to be received in most cases.)

Item	Obligations, 1955	Estimated obligations, 1956	Estimated obligations, 1957
Allotments from:			
<u>Agricultural Conservation Program,</u>			
<u>Agriculture - For farm land restora-</u>			
<u>tion in flood-stricken areas</u>	\$10,868:	- -	- -
Allocations and Working Funds			
(Advances from other agencies):			
<u>Atomic Energy Commission - For inves-</u>			
<u>tigations pertaining to use of</u>			
<u>isotopes in ion absorption by plants</u>			
<u>and the reaction in soils</u>	14,229:	16,271:	- -
<u>Department of the Army - For the</u>			
<u>preparation of soil maps, studies of</u>			
<u>soil, trafficability, and state of</u>			
<u>ground and soils</u>	64,999:	84,225:	- -
<u>International Cooperation Administra-</u>			
<u>tion - For expenses in connection</u>			
<u>with training and technical assist-</u>			
<u>ance activity</u>	38,871:	44,950:	- -
Total, Allocations and Working			
Funds	118,099:	145,446:	- -
Trust Funds:			
<u>Payments in Lieu of Taxes, and Opera-</u>			
<u>tion and Maintenance Costs, Water</u>			
<u>Conservation and Utilization Pro-</u>			
<u>jects - Receipts from land leases</u>			
<u>for payments in lieu of taxes to</u>			
<u>States, political subdivisions</u>			
<u>thereof, and local taxing units, and</u>			
<u>for operation and maintenance ex-</u>			
<u>penses of the resettlement features</u>			
<u>of certain water conservation and</u>			
<u>utilization projects (40 U.S.C. 431-</u>			
<u>434)</u>	60,894:	- -	- -

(Continued on next page)

Item	Obligations, 1955	Estimated obligations, 1956	Estimated obligations, 1957
Technical Services and Other Assistance, Agricultural Conservation Program Service, Soil Conservation Service, Department of Agriculture -			
For technical and other assistance to farmers and ranchers in participating counties pursuant to agreements with individual Agricultural Stabilization and Conservation State and County Committees	5,838,000:	6,287,800:	7,000,000
Miscellaneous Contributed Funds, Department of Agriculture (deposited by cooperating agencies, as follows):			
For flood control works of improvement on the Los Angeles River watershed	423,098:	491,399:	382,400
For cooperation with the Tallahatchie Drainage District and the Tallahatchie River Conservancy District in connection with works of improvement for run-off and waterflow retardation in the Little Tallahatchie River Watershed	44,047:	- -	- -
For cooperation with Cane Creek Drainage Commissioners of Union and Tippah Counties, Mississippi, and Tallahatchie River Soil Conservation District for works of improvement for run-off and waterretardation and soil erosion prevention in Little Tallahatchie River	- -	20,000:	- -
For cooperation with contributors and the Holmes County Soil Conservation District, Mississippi, in connection with flood prevention in the Black Creek and Yazoo River Watersheds	2,500:	1,500:	- -
For cooperation with City of Kaufman, Texas in the construction of a dual-purpose municipal water supply and a floodwater retarding structure on Big Cottonwood Creek :	15,277:	6,265:	- -
For cooperation with various contributors in emergency flood restoration programs	5,529:	- -	- -

(Continued on next page)

Item	: : Obligations, : 1955	: Estimated : obligations, : 1956	: Estimated : obligations, : 1957
For cooperation with various contri- butors in a survey of watersheds for: run-off and waterflow retardation and soil erosion prevention	: : : 81,637:	: : : 107,350:	: : : 1,132,768
For cooperation with Soil Conserva- tion Commission, State of California: in developing cultural methods and experimental seed supplies at the Pleasanton, California Nursery	: : : 24,746:	: : : 35,540:	: : : 30,000
For cooperation with Tillamook, Clatsop, and Columbia Counties, Oregon, for aerial photography work.:	: : 207:	: : 1,266:	: : - -
Total, Miscellaneous Contributed Funds, Department of Agriculture ..	: 597,041:	: 663,320:	: 1,545,168
Total Trust Funds	: 6,495,935:	: 6,951,120:	: 8,545,168
Obligations under Reimbursements from Governmental and Other Sources:	: :	: :	: :
Conservation Operations:	: :	: :	: :
For sale of cartographic reproduc- tions, cooperative projects with State agencies, detail of person- nel to other Federal agencies, sale of equipment and accessories for which the proceeds are used to purchase similar items, etc....	: : : : : 1,651,010:	: : : : : 1,679,300:	: : : : : 1,695,000
Watershed Protection	: 11,305:	: 20,000:	: 23,000
Flood Prevention	: 18,187:	: 36,400:	: 37,000
Water Conservation and Utilization Projects	: 8,145:	: 830:	: - -
Total, reimbursements	: 1,688,647:	: 1,736,530:	: 1,755,000
TOTAL OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS	: 8,313,549:	: 8,833,096:	: 10,300,168

PASSENGER MOTOR VEHICLES

Conservation Operations

The estimates for 1957 include the scheduled replacement of 196 passenger motor vehicles during the fiscal year. The Service authorizes the use of passenger motor vehicles for area conservationists, technical specialists, survey supervisors and State Office personnel in areas where public transportation is inadequate or nonexistent, or for types of travel where considerable distances are involved and the use of pickup trucks or public transportation is not feasible. Much of the use of these passenger vehicles is for transportation of personnel to several locations in a single day where frequent stops are made to examine field work in progress or to discuss with resident technicians at isolated points the program of soil conservation being conducted in the area. Because of the nature of this travel, the frequency of the stops, and the fact that common carrier facilities do not serve the rural areas, it is impossible to use other means of transportation.

It is estimated that the 196 passenger motor vehicles will cost \$196,800 after applying the trade-in value of the old vehicles.

Watershed Protection

The estimates for 1957 include the replacement of 30 passenger vehicles under this item. The vehicles are required by planning technicians in connection with making surveys and investigations of watersheds on which applications for the establishment of watershed projects have been received, and for the planning and supervision of the installation of works of improvement in watershed project areas.

It is estimated that the 30 passenger motor vehicles will cost \$49,500.

Flood Prevention

The estimates for 1957 include the scheduled replacement of 8 passenger motor vehicles during the fiscal year. These vehicles will replace a similar number of vehicles now in use. The vehicles are used by employees of the Service engaged in the installation of works of improvement on approved Flood Prevention projects.

These technical specialists usually have to travel considerable distances in rural areas where public transportation is inadequate or nonexistent and under circumstances where the use of pickup trucks is not feasible.

It is estimated that the 8 passenger motor vehicles will cost \$8,400 after applying the trade-in value of a similar number of old vehicles.

Water Conservation and Utilization

The estimates for 1957 include the scheduled replacement of one passenger vehicle during the fiscal year. It will replace a similar vehicle now in use. The vehicle is used by employees of the Service engaged in the development of lands for irrigation.

The technicians usually have to travel considerable distances in rural areas where public transportation is not available and the use of pickup trucks is not feasible.

It is estimated that the one passenger vehicle will cost \$1,050 after applying the trade-in value of a similar old vehicle.

General

The total number of passenger vehicles operated by the Soil Conservation Service on June 30, 1955 was 1,148. Of this number only one vehicle is used in Washington, D. C. The balance are distributed among the 51 State and Territorial Offices, approximately 305 area offices, and various technical specialists located at other field headquarters. The travel of resident technicians serving the soil conservation districts to field areas to perform engineering work, conduct surveys, lay out conservation plans or to prepare plans with the farmers and ranchers is performed by pickup trucks.

All of the vehicles proposed to be replaced will be well within the standards of 60,000 miles or 6 years established by the General Services Administration. Many of these vehicles have reached such an age and mileage that they are now uneconomical to operate. Also, due to the normal deterioration of the vehicles, it is necessary to have many of them out of use for excessive periods of time for repairs.

The policy of the Soil Conservation Service, based on past years' experience in operating passenger motor vehicles, is to replace one-seventh of the inventory each year since this would permit replacement of vehicles which have reached seven years of age and have been driven approximately 70,000 miles. However, circumstances have prevented the Service from attaining this schedule of replacement. As of June 30, 1955 the Service had 202 vehicles seven years or older and about 379 which have been driven 70,000 miles or more. The Service will replace 151 of these during the 1956 fiscal year. By June 30, 1956 another 148 vehicles will have been in use seven years and about 147 additional vehicles will have been driven 70,000 miles. The 235 replacements proposed in the 1957 fiscal year will put replacements back on schedule as far as age of vehicles is concerned and will reduce the number of vehicles driven over 70,000 miles to a point where they can be replaced the following year. In order to utilize the passenger transportation equipment, cars are not exclusively assigned to one individual at locations where more than one employee has need for the equipment, thereby allowing several employees to use a single passenger car.

Under Service policy all employees are directed to coordinate travel to the same locality in order that two or more employees may be transported at the same time to receive maximum utilization of equipment.

Below is itemized a statement as to the ages and mileage of passenger motor vehicles of the Soil Conservation Service as of June 30, 1955.

<u>Mileage</u>	<u>Number of Vehicles</u>	<u>Percentage</u>
0 - 1,000	9	0.8
1,000 - 10,000	82	7.1
10,000 - 20,000	66	5.6
20,000 - 30,000	104	9.1
30,000 - 40,000	110	9.6
40,000 - 50,000	112	9.7
50,000 - 60,000	135	11.8
60,000 - 80,000	297	25.9
80,000 - 100,000	175	15.3
Over 100,000	58	5.1
	<u>1,148</u>	<u>100.0</u>

<u>Year Model</u>	<u>Number of Vehicles</u>	<u>Percentage</u>
1955	94	8.2
1954	48	4.2
1953	196	17.1
1952	102	8.9
1951	205	17.8
1950	145	12.6
1949	149	13.0
1948	164	14.3
1947	33	2.9
Prior year models	12	1.0
	<u>1,148</u>	<u>100.0</u>

AGRICULTURAL CONSERVATION PROGRAM SERVICE

Purpose Statement

The Agricultural Conservation Program is authorized under the provisions of sections 7 to 17, inclusive, of the Soil Conservation and Domestic Allotment Act, as amended.

The purposes of the Act include (1) restoring and improving soil fertility, (2) reducing erosion caused by wind and water, and (3) conserving water on land. To effectuate these purposes, the Agricultural Conservation Program offers cost-sharing assistance to individual farmers and ranchers in all of the 48 States, Alaska, Hawaii, Puerto Rico and the Virgin Islands for carrying out approved soil-building and soil-and-water conserving practices on their farms. This assistance represents only a part of the cost of performing the practice. The farmer bears the balance of the cost and in addition supplies the labor necessary to carry out the practice. Allocations are made to States based upon conservation needs.

Cost-sharing assistance is offered only for the practices considered necessary to meet the most urgently needed conservation problems of the farm, which would not otherwise be carried out to the extent needed. To be eligible for cost-sharing the farmer must make application therefor before beginning the practice.

Conservation measures for which cost-sharing assistance is offered, include practices primarily for:

1. Establishment of permanent protective cover.
2. Improvement and protection of established vegetative cover.
3. Conservation and disposal of water.
4. Establishment of temporary vegetative cover.
5. Temporary protection of soil from wind and water erosion.

Cost-sharing assistance is available in the form of:

1. Partial payment of the purchase price of materials and services needed by the farmer for carrying out approved practices, or
2. Partial reimbursement to farmers who have carried out approved practices at their own expense.

Materials and services are obtained through local private sources where practicable.

Rates of assistance vary by practices and by States and areas so as to make the most effective use of available funds.

	<u>Estimated Available, 1956</u>	<u>Budget Estimate, 1957</u>
Appropriated funds	\$214,500,000	\$225,000,000

AGRICULTURAL CONSERVATION PROGRAM

	<u>On Direct Appropriation Basis</u>	<u>On Program Authorization Basis</u>
Appropriation Act, 1956 and base for 1957	\$214,500,000	\$250,000,000
Budget Estimate, 1957	225,000,000	250,000,000
	<u>+10,500,000</u>	<u>- -</u>

SUMMARY OF INCREASES AND DECREASES, 1957
(on basis of program authorization)

Decrease in cost-sharing assistance to farmers in carrying out conservation measures	-1,650,000
Increase in operating expenses for Agricultural Stabili- zation and Conservation county committees	+1,438,000
Increase in operating expenses for Agricultural Stabili- zation and Conservation State Offices	+212,000

The Agricultural Conservation Program is operated on a calendar (crop) year basis. The 1955 program which closed on December 31, 1955, is financed primarily from funds provided in the 1956 Department of Agriculture and Farm Credit Administration Appropriation Act. In that Act, the Congress also authorized the formulation and administration of a 1956 Agricultural Conservation Program amounting to \$250,000,000 for which the 1957 Budget Estimate is submitted.

A direct appropriation of \$225,000,000 is requested for the 1956 program. The balance of \$25,000,000 to provide for the full \$250,000,000 program will be financed from balances under the 1954 program.

PROJECT STATEMENT
(on basis of program authorizations)

Item	Appropriation : 1955 (1954 program)	Appropriation : 1956 (1955 program)	Program : Increases	Total Estimate : 1957 (1956 program)
AGRICULTURAL CONSERVA-	:	:	:	:
TION PROGRAM:	:	:	:	:
1. Cost-sharing	:	:	:	:
assistance to	:	:	:	:
farmers	a/ \$141,288,961	b/ 225,461,132	- 1,650,000(1)	223,811,132
Other program	:	:	:	:
expenses	1,003,009	1,490,868	- -	1,490,868
Total program	:	:	:	:
expenses	142,291,970	226,952,000	- 1,650,000	225,302,000
2. Operating ex-	:	:	:	:
penses:	:	:	:	:
County committee	:	:	:	:
operating ex-	:	:	:	:
penses:	:	:	:	:
ASC county	:	:	:	:
committees. :	18,378,200	18,378,200	+1,438,000(2)	19,816,200
Forest Service ..	88,261	108,000	- -	108,000
Subtotal	18,466,461	18,486,200	+1,438,000	19,924,200
National and State:	:	:	:	:
office operating:	:	:	:	:
expenses:	:	:	:	:
Agricultural	:	:	:	:
Conservation	:	:	:	:
Program Ser-	:	:	:	:
vice	369,476	436,247	- -	436,247
Commodity	:	:	:	:
Stabiliza-	:	:	:	:
tion Service :	564,564	528,905	- -	528,905
ASC State	:	:	:	:
Committees.. :	3,115,879	3,581,463	+212,000(3)	3,793,463
Forest Ser-	:	:	:	:
vice	14,200	15,185	- -	15,185
Subtotal .. :	4,064,119	4,561,800	+212,000	4,773,800
Total operating	:	:	:	:
expenses	22,530,580	23,048,000	+1,650,000	24,698,000
Total pay costs	:	:	:	:
(P. L. 94)	[77,037]	[305,868]	[+12,000]	[317,868]
Total obligations,	:	:	:	:
Agricultural Con-	:	:	:	:
servation Program:	164,822,550	250,000,000	- -	250,000,000

(Continued on next page)

Item	:Appropriation : : 1955 : :(1954 program):	:Appropriation : : 1956 : :(1955 program):	: Program : : Increases	:Total Estimate : : 1957 : :(1956 program)
Adjustments:	:	:	:	:
Difference in	:	:	:	:
amount used for	:	:	:	:
advance purchase:	:	:	:	:
of conservation :	:	:	:	:
materials and :	:	:	:	:
services from :	:	:	:	:
prior fiscal :	:	:	:	:
year appropria- :	:	:	:	:
tion for cur- :	:	:	:	:
rent program and:	:	:	:	:
amount used for :	:	:	:	:
advance pur- :	:	:	:	:
chase of con- :	:	:	:	:
servation :	:	:	:	:
materials and :	:	:	:	:
services from :	:	:	:	:
current fiscal :	:	:	:	:
year appropria- :	:	:	:	:
tion for ensu- :	:	:	:	:
ing calendar :	:	:	:	:
year	: +19,183,569 :	: +500,000 :	: -500,000 :	: - - :
Received by loan :	:	:	:	:
from CCC	: -43,450,000 :	: -43,450,000 :	: - - :	: -43,450,000 :
Repayment of loan :	:	:	:	:
from CCC	: +51,143,881 :	: +7,450,000 :	: +11,000,000 :	: +18,450,000 :
Appropriation or :	:	:	:	:
estimate	: 191,700,000 :	: 214,500,000 :	: +20,500,000 :	: 225,000,000 :
:	:	:	:	:

a/ Excludes payments of \$7,910,000 from supplemental appropriations of \$20,000,000 in 1955 for assistance to farmers in carrying out emergency wind erosion control measures.

b/ Excludes \$12,090,000 available from prior-year balance for making payments to farmers carrying out emergency wind erosion control measures.

ADVANCE AUTHORIZATION FOR THE 1957 AGRICULTURAL CONSERVATION PROGRAM

An authorization of \$250 million is proposed for the 1957 Agricultural Conservation Program which will permit the formulation of a program of the same level and scope as the program for 1956.

It is contemplated that the 1957 Agricultural Conservation Program will be quite similar to the 1956 program and that there will be no appreciable change in the need for conservation and cost-sharing. It is not contemplated that any change will be made in the method used to distribute funds among States, the formula for which is set forth in the appropriation language. The formula also is included in section 15 of the Soil Conservation and Domestic Allotment Act as amended by the Agricultural Act of 1954.

INCREASES AND DECREASES

(1) A decrease of \$1,650,000 in cost-sharing assistance to farmers in carrying out conservation measures.

A comparable decrease in cost-sharing assistance to farmers of \$1,650,000 which is offset by an increase in operating expenses as explained below.

(2) An increase of \$1,438,000 for county committee expenses.

An increase of \$1,438,000 to increase the salaries of ASC county committee office and field employees including office managers. County committee employees generally receive lower wages than Federal employees doing comparable work and this condition has resulted in excessive turnover of personnel, inability to obtain competent help, excessive losses of good personnel after short periods of service and in many instances inferior performance of program functions. It is proposed to increase such salaries over a period of three years beginning in the fiscal year 1957 so as to approach Federal rates but to be consistent with local situations. The increase represents the Agricultural Conservation Program's share of one-third of the total estimated cost of such wage adjustments. More information with respect to this proposal is contained in the justification of the item "Agricultural Adjustment Programs."

(3) An increase of \$212,000 in operating expenses to provide more adequate supervision of Agricultural Stabilization and Conservation County Committees.

An increase of \$500,000 was requested for this purpose in the 1956 budget estimate, of which \$300,000 was made available in the 1956 fiscal year appropriation act.

Agricultural Stabilization and Conservation County Committees are responsible for the administration of the Agricultural Conservation Program at the local levels. Supervision and review by ASC State Offices of the county committee operations is presently inadequate to insure acceptable work by the county committees. Additional funds are needed to provide

more assistance in all phases of the Agricultural Conservation Program. It is essential that more work, primarily by ASC State Offices, be performed on the following specific items: (1) informing and training county committees and their employees on the overall operations of the program and assisting them in devising ways to get the work done, (2) maintaining a check on the progress of the work and taking positive action to improve such progress when it is unsatisfactory, (3) reviewing the paper work necessary for furnishing assistance (this is especially important since the General Accounting Office preaudit work has been stopped), and (4) auditing operations of the county committees in connection with past and current programs.

CHANGES IN LANGUAGE

The estimates include proposed changes in the language of this item as follows (new language underscored; deleted matter enclosed in brackets):

- For necessary expenses to carry into effect the provisions of sections 7 to 17, inclusive, of the Soil Conservation and Domestic Allotment Act, approved February 29, 1936, as amended. (16 U.S.C. 590g-590q), including not to exceed \$6,000 for the preparation and display of exhibits, including such displays at State, interstate, and international fairs within the United States; [~~\$214,500,000~~] \$225,000,000, to remain available until December 31 of the next succeeding fiscal year for compliance with the program of soil-building practices and soil- and water-conserving practices authorized under this head in the Department of Agriculture and Farm Credit Administration Appropriation Act [1955] 1956, carried out during the period July 1, [1954] 1955, to December 31, [1955] 1956, inclusive: Provided,
- 1 That not to exceed [~~\$22,800,000~~] \$24,698,000 of the total sum provided under this head shall be available during the current fiscal year for salaries and other administrative expenses for carrying out such program, the cost of aerial photographs, however, not to be charged to such limitation; but not more
 - 2 than [~~\$4,320,000~~] \$4,773,800 shall be transferred to the appropriation account, "Administrative expenses, section 392, Agricultural Adjustment Act of 1938": Provided further, That payments to claimants hereunder may be made upon the certificate of the claimant, * * * Provided further, That such amount shall be available for salaries and other administrative expenses in connection with the formulation and administration of the [1956] 1957 program of soil-building practices and soil- and water-conserving practices under the Act of February 29, 1936, as amended (amounting to \$250,000,000, including administration, and formulated on the basis of a distribution of the funds available for payments and grants among the several States in accordance with their conservation needs as determined by the Secretary, except that the proportion allocated to any State shall not be reduced more than 15 per centum from the distribution for the next preceeding program year, and no participant shall receive more than \$1,500, except where the participants from two or more farms or ranches join to carry out approved practices designed to conserve or improve the agricultural resources of the community); but the

- payments or grants under such programs shall be conditioned upon the utilization of land with respect to which such payments or grants are to be made in conformity with farming practices which will encourage and provide for soil-building and soil- and water-conserving practices in the most practical and effective manner and adapted to conditions in the several States, as determined and approved by the State committees appointed pursuant to section 8 (b) of the Soil Conservation and Domestic Allotment Act, as amended (16 U.S.C. 590h (b)), for the respective States: Provided further, That not to exceed 5 per centum of the allocation for the [1956] 1957 agricultural conservation program for any county may, on the recommendation of such county committee and approval of the State committee, be withheld and allotted to the Soil Conservation Service for services of its technicians in formulating and carrying out the agricultural conservation program in the participating counties, and the funds so allotted may be placed in a single account for each State, and shall not be utilized by the Soil Conservation Service for any purpose other than
- 3 technical and other assistance in such counties, and in addition, not to exceed 1 per centum may be made available to any other Federal, State, or local public agency for the same purpose and under the same conditions: Provided further, That for the [1956] 1957 program \$2,500,000 shall be available for technical assistance in formulating and carrying out agricultural conservation practices and \$1,000,000 shall be available for conservation practices related directly to flood-prevention work in approved watersheds: Provided further, That in carrying out the [1956] 1957 program the Secretary shall give particular consideration to the conservation problems on farmlands diverted from crops under acreage-allotment programs: * * *
- 4 [Not to exceed \$5,000,000 of the appropriation under the head "Agricultural Conservation Program Service", in the Department of Agriculture and Farm Credit Administration Appropriation Act, 1955, shall be available for the purposes specified under the head "Agricultural conservation program", in the Second Supplemental Appropriation Act, 1955, and shall be merged with the amount provided therein.]

Other than the usual changes in year dates applicable to the program covered by the appropriation and the period of availability thereof, the estimates include proposed changes in language of the item as follows:

The first and second changes increase the amount of the total administrative expense limitation from \$22,800,000 to \$24,698,000, and the amount which can be transferred to the account for State and National expenses from \$4,320,000 to \$4,773,800. The increase consists of \$248,000 for increased pay costs in 1956, of which \$241,800 represents an increase in pay costs under Section 392, and proposed increases in 1957 of (1) \$212,000 in the amount to be transferred to the appropriation account established under section 392 of the Agricultural Adjustment Act of 1938, as amended, to provide more adequate supervision and

review of ASC county committee operations, and (2) \$1,438,000 to permit the initiation of a 3-year program which will bring the average salaries for the Agricultural Stabilization and Conservation county committee employees in line with present salary scales for classified employees performing comparable work, as explained in the justification of the estimate.

The third change proposes to insert new language which would permit the allotment of up to 1% of any county allocation to agencies other than the Soil Conservation Service qualified to furnish technical services. Many of the conservation measures for which cost-sharing assistance is offered to farmers under the ACP, must be based on sound technical determinations in order for them to be successfully carried out by the farmer. The nature of this technical assistance varies with the kind of conservation measure. Some measures require that detailed engineering specifications be determined and followed carefully. Some require the determination of proper sites or locations on the farm. Many practices require specialized knowledge of agronomy and silviculture.

The primary source for obtaining technical assistance available to State and county ASC Committees is the SCS. For several years technical assistance has been obtained from SCS technicians. It is expected that such services will continue to be obtained from them on at least as extensive a basis if not greater than in past years. Work provided by SCS technicians is financed from regular SCS funds supplemented by transfers of ACP funds to the SCS under the "5% transfer provision". These transfers are limited to 5% of the county ACP allocation.

Practices relating to forestry do not come under the scope of SCS responsibilities. The Secretary has assigned the responsibility for the technical phase of those practices to the Forest Service. The assistance currently being provided for these practices is furnished by forestry employees of State or other local public agencies, and to a limited extent by the Federal Forest Service. In some other situations the only source from which the needed technical assistance may be obtained is from a State or local Government agency such as county engineers or technicians of irrigation and drainage districts. There is no authority under present legislation to provide any additional funds to these local public agencies for the technical work rendered. Even though the other agency personnel is involved, SCS will have general responsibility for quality standards which the technical services must meet.

For the reasons indicated above, it is recommended that authority be provided to transfer, when needed, funds to Federal, State or other public agencies, in addition to the authority to transfer such funds to the SCS. It is not proposed to lessen the responsibility to SCS in providing technical assistance for the ACP - rather the purpose is to obtain authority to secure only the additional services needed from other agencies on the same basis. SCS technicians are generally available in most areas. However, in some instances the SCS does not have any or enough personnel to provide the necessary work and in these situations the additional authority would make it possible to provide farmers with the needed technical assistance under the program. It is believed that

farmers in such areas are entitled to receive technical assistance to the same degree that farmers in other areas are able to obtain it.

Although the proposed change in the appropriation language would authorize the use of additional funds for technical assistance up to 1% of the county allocation, the total additional amount used would be substantially less than 1% of the national total. Many counties would require no transfer other than to SCS, in which case the new wording would not cause any additional funds to be used for this purpose.

The fourth change eliminates language which was provided in the Supplemental Appropriation Act, 1956, approved August 4, 1955, to make available not more than \$5 million of the appropriation under the head "Agricultural Conservation Program Service" in the 1955 appropriation act for making payments to farmers who carry out emergency wind erosion control measures under the 1955 program. Such language is not needed in the 1957 appropriation act.

STATUS OF PROGRAM

Current Activities :

Conservation of agricultural soil and water resources is recognized as essential to the future wellbeing of the Nation. Not only is it essential to assure continued supply of food, fiber and shelter for an increasing population, but also to supply the largest part of the raw materials that go into the expanding economy of the Nation. Farms and forests supply annually over 70 percent of all raw material used in the economy of the country. Transporting, processing, financing and handling these raw materials so as to make them useful and supply them where they are needed makes up a large part of all the business and commerce that furnishes the livelihood for the Nation's nonfarm population. Because of their interests in food, fiber and shelter and a continued healthy economy, nonfarm people have perhaps an even greater interest in conservation of soil and water resources than farmers themselves.

There are few, if any, conservation measures that do not require an initial investment in materials, in power, or in labor. Recovery of investment in many needed conservation measures is relatively slow as compared to investment of capital in measures necessary for production of things to sell and produce income. One of the problems of carrying out conservation measures is that the more enduring conservation measures are usually more costly and require a longer period of time before a return on the additional capital investment is realized. Some conservation measures with the greatest permanence will not, of themselves, ever return to the farm operator the capital invested in them.

It is with this background of cost and returns from conservation and the public's dependence upon the conservation of soil and water resources that Federal cost-sharing of conservation practices on individual farms is offered. Research and experimental work have developed and are developing means by which soil and water resources can be conserved. Educational work is teaching the value and need for conservation work. Technical services help determine the conservation measures that are needed and furnish engineering and technical services to correctly install them. Federal cost-sharing by the Agricultural Conservation Program helps overcome the economic barriers to carrying out conservation measures. The basic purpose of the Agricultural Conservation Program is to afford a means by which all the people may bear a part of the costs of those measures that would not otherwise be carried out at the rate needed to meet the public interest. It assists farmers to protect the public's interest in the Nation's soil and water resources by sharing with individual farmers and ranchers the cost of carrying out soil and water conserving practices more rapidly and to a fuller extent than would be effected through usual farm management practices. The program helps insure continued abundant production for all of the people of the country.

Changes in Agricultural Conservation Program. The Agricultural Conservation Program for 1955 continued the general program principles adopted for use under the 1954 Agricultural Conservation Program. These principles, in general, authorize Federal cost-sharing for the initial application of

of conservation practices which are needed to meet conservation problems on land now in agricultural production and which would not be carried out to the needed extent without program assistance. The 1955 program included all of the practices which were included in the 1954 program with appropriate changes to make the program more effective in meeting the conservation problems on land shifted out of crop production in 1955. Also a new practice involving the establishment of vegetative cover to protect cropland throughout the 1955 crop year was added to the 1955 program. This practice was designed primarily to encourage the use of green manure and cover crops on cropland shifted for the entire 1955 crop year from crop production.

In order to encourage better performance of practices involving the establishment or improvement of vegetative cover, the program provisions with regard to applications of liming materials and fertilizer were changed to permit cost-sharing for quantities of material between a minimum required application and an optimum application. A similar eligible range of performance was made applicable to seeding rates and other appropriate measures involved in the performance of approved conservation practices.

Special provision was made for practices requiring more than one program year for completion. This constituted an authorization for cost-sharing for the completion of an effective part of a practice during the program year on the condition that the remaining parts would be completed during a subsequent program year.

Program Development. Development of the Agricultural Conservation Program begins at the local or county level. The county Agricultural Stabilization and Conservation Committee with the assistance of the County Agent and representatives of the Soil Conservation Service, Forest Service, and other local agencies interested in conservation, make recommendations to the State Agricultural Stabilization and Conservation Committee. These are summarized by the State Committee and used as the basis for the State Extension Service, Soil Conservation Service, Forest Service, the State Agricultural Stabilization and Conservation Committee and other agencies interested in conservation to formulate joint recommendations to the Agricultural Conservation Program Service in Washington.

From these recommendations, the Agricultural Conservation Program Service, the National Extension Service, Soil Conservation Service, and Forest Service develop and recommend to the Secretary a national program. State and county committees then develop their programs within the structure of the national program approved by the Secretary.

Program Administration. The Agricultural Conservation Program is administered locally by County Agricultural Stabilization and Conservation Committees. These committees are made up of resident farmers elected by the farmers they serve. County committees are supervised by State Agricultural Stabilization and Conservation Committees consisting of resident farmers appointed by the Secretary of Agriculture. The local County Agent is an ex officio member of the county committee and the State Director of Extension holds a like position on the State Committee.

State, county, and community committeemen are assigned the responsibility for the field administration of the program and work directly with farmers in utilizing program assistance in an effort to get the greatest volume of conservation performed on the land by the farmers themselves. The responsibility for technical determinations regarding permanent-type practices in the field is assigned to the Soil Conservation Service except for forestry practices, responsibility for which is assigned to the Forest Service.

Participation under the 1954 Agricultural Conservation Program

Item	Unit	Total 1/	Participating 1/	Portion Participating
				Percent
Farms	Number	5,465,803	1,095,810	20
Farm land	1,000 acres	1,243,841	404,226	32
Cropland	1,000 acres	477,918	164,769	34
Noncrop pasture and range	1,000 acres	560,075	180,394	32

1/ Includes United States, Alaska, Hawaii, Puerto Rico, and Virgin Islands.
Does not include the Naval Stores Conservation Program.

The Program for 1955

The Department is carrying out in 1955 an Agricultural Conservation Program consistent with the authorization provided by the Congress in the Department of Agriculture and Farm Credit Administration Appropriation Act, 1955. Program emphasis has been directed to those practices which are essential in the public interest and which farmers or ranchers would not carry out to the desired extent with their own resources, and to practices needed to meet the conservation problem on land being shifted out of crop production in 1955. The selection of the practices from the national program to be included in the program for a county is the responsibility of the County Agricultural Stabilization and Conservation Committee and local representatives of the Soil Conservation Service and Forest Service, working with other agricultural agencies in the county. Provision is made for the development of additional conservation practices to meet special county conservation needs which cannot be met by the conservation practices in the national program.

The drought in the summer and fall of 1954 damaged pastures and other sod crops in many States. It also created a need for greater assistance in the seeding of cover crops. It became apparent in the fall of 1954 that farmers in drought areas, because of their economic situation, were not able to supply matching funds for adequate use of practices to reestablish erosion controlling sod. Consequently, all drought States were authorized to realign their programs to meet the problems of drought-damaged lands and to open their 1955 programs in the fall of 1954. In this manner there was continuing activity without any letup as would have occurred had not the action been taken. In these areas modification of the program was continued in the spring of 1955 to provide continuing means of meeting the urgent conservation problems caused by the drought.

Serious wind erosion damage occurred in the spring of 1955 in seven States in the Southern and Central Great Plains. The Congress authorized the use of approximately \$7 million of the uncommitted balance of the original appropriation of \$15 million made for the 1954 program to help the emergency problem in this area for the 1955 program. Further authority was granted to transfer \$5 million additional funds from the regular 1954 Agricultural Conservation Program for use in this emergency in the 1955 program. The total available for this purpose was approximately \$12 million for the 1955 program. These special funds are used for locally-developed conservation practices involving emergency tillage and other measures to control wind erosion.

The Program for 1956

The program for 1956 will retain the major program provisions which have been in effect for the 1954 and 1955 programs. The authority for local development and adaptation of the program will be continued.

State groups responsible for the development of State Agricultural Conservation Programs will be authorized to establish rates of cost-sharing in excess of 50 percent of the average cost of performing practices which have long-lasting conservation benefits and from which the returns to the farmer or rancher are remote, where this is essential to obtaining desired performance of these practices. The rates of cost-sharing for these practices, however, will be such that the farmers or ranchers will make a substantial contribution to the cost of performing the practices. As provided by legislation the maximum cost-share to any person for the performance of approved conservation practices will be increased to \$10,000 where the practices are for community benefit and are carried out by more than one person under agreements whereby program cost-shares which could be earned by the person involved are pooled for the performance of a practice or practices benefiting the lands of all such persons. These changes in the rates of cost-sharing and in the maximum cost-share will help to encourage the use of practices which provide more enduring conservation benefits.

Distribution among States of the funds available for program assistance is made in accordance with their conservation needs except for the minimum allotment provision contained in both section 15 of the Soil Conservation and Domestic Allotment Act, as amended, and in the 1956 appropriation act. Funds for the Naval Stores Conservation Program are subtracted before the conservation needs formula is applied. The amount subtracted for Naval Stores is determined in the same manner as that used for 1948 and each subsequent program and is based on the need for assistance under the Naval Stores Conservation Program as related to the total funds available for cost-sharing assistance to farmers.

The Congress has authorized a 1956 program of \$250 million, the same as for the 1955 program. Particular attention will again be given to the conservation needs on land diverted from the production of crops for which allotments are established. County committees will be urged to give special consideration to requests for cost-sharing for practices which are needed to meet the problems on such land.

Estimated Need for Selected Conservation Measures and Amount
Performed under the 1954 Agricultural
Conservation Program

Practice	Unit	Estimated remaining needs 1/ 2/	Extent Under the 1954 ACP
Dams and reservoirs 3/	Number	2,620,895	74,443
Drainage 4/	Acre	69,318,041	1,307,297
Leveling land to conserve irrigation water and pre- vent erosion	Acre	11,203,582	377,628
Standard terraces	Acre	106,861,527	728,360
Diversion and spreader ter- races	Mile	467,246	37,295
Establishing contour strip- cropping 5/	Acre	41,873,115	190,406
Stripcropping not on the contour	Acre	31,906,079	773,334
Control of competitive shrubs on range or pasture	Acre	87,761,149	1,335,520
Tree planting	Acre	29,445,415	115,774
Liming materials applied for: conserving uses	Ton	80,771,976	12,456,783
Permanent sod waterways	Acre	4,738,000	36,070
Establishing permanent cover: on land subject to erosion	Acre	8,311,261	733,634
All other vegetative cover	Acre	251,754,569	9,646,297

1/ As approved by the Secretary of Agriculture July 1952.

2/ Need remaining after 1949.

3/ Includes storage-type structures for erosion control, livestock water, and irrigation (new structures only).

4/ Includes open and enclosed type drainages.

5/ Also includes the establishment of cross-slope stripcropping.

Accomplishments Under the Agricultural Conservation Programs -
1936-1954

Conservation measure	Amount
Dams and reservoirs <u>1/</u>	1,296,172 dams
Drainage <u>2/</u>	34,014,504 acres
Leveling land to conserve irrigation water and prevent erosion	6,455,442 acres
Standard terraces	1,125,375 miles
Diversion and spreader terraces	110,040 miles
Establishing contour stripcropping <u>3/</u>	4,977,467 acres
Stripcropping not on the contour	101,702,527 acres
Control of competitive shrubs on range or pasture :	31,298,945 acres
Tree planting	1,318,072 acres
Liming materials applied for conserving uses	326,608,636 tons
Permanent sod waterways	414,191 acres
Establishing permanent cover on land subject to erosion	3,422,238 acres
All other vegetative cover	394,012,511 acres

1/ Includes storage-type structures for erosion control, livestock water, and irrigation (new structures only).

2/ Includes acreage drained under both open and enclosed methods.

3/ Includes cross-slope stripcropping.



